

Rutland County Commutershed Report:
Connecting the People and Planners of Rutland County with
Sustainable Transportation Resources

Middlebury College
ENVS Senior Seminar
Spring 2014

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We have neither given nor received unauthorized aid on this assignment.

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ACKNOWLEDGEMENTS

This project would not have been possible without the unconditional help of a lot of people. First of all, we would like to thank our community partners in Rutland, Steve Schild and Susan Schriebman from the RRPC, who answered many questions on GIS data and Way to Go logistics. We would also like to thank the many other community members who provided valuable information and assistance during our project: Suzanne Elowson, Kimberly Griffin, Julia Andrews, Jody Sabataso, Aaron Witham, John Tedesco, PEG TV, the Rutland Chamber of Commerce, and the Rutland Area Food Coop. This project would be impossible without the support of the Environmental Studies Program in Middlebury College: Molly Costanza-Robinson for challenging us with inspiring questions and Diane Munroe for sorting out all the logistics for us. Special thanks to Elizabeth Courtney for her book *Greening Vermont* that better informs us of the past and future of this place called Vermont that we all love. Thanks Greg Sharrow from the Vermont Folklife Center and Mike Kiernan from Persuasive Communication, Creativity and Innovation Program for guiding us in telling persuasive stories. Thanks Middlebury Town Planner Eric Blair, Sarah Simonds '10 from Vital Communities, and all the presenters at the ES Colloquium in Spring 2014 for all the beneficial conversation they initiated. Last but not the least, huge thanks and hugs to The Bus Team, Sara Arno, Kevin Chu, Daniel Hellman, Julian Macrone and Eleni Polychroniadou for sharing their experience in Rutland and surviving late-night paper writing in Hillcrest with us.

Although the information in this document/website/video has been funded in part by the U.S. Environmental Protection Agency under assistance agreement to Bates College, it may not necessarily reflect the views of the Agency and no official endorsement should be inferred.

INTRODUCTION

As a state, Vermont has shown an impressive commitment to sustainability. Currently, it has the United States' 11th lowest energy consumption per capita (EIA, 2011), but it has committed to even greater reductions in an effort to combat climate change. The state government has already set the ambitious goals of reducing greenhouse gas emissions to 25% of 1990 levels by 2012, 50% by 2028, and 75% by 2050; however, in order to meet these goals, Vermont and its citizens must make efforts on both the regional and individual level to reduce environmental impacts (Vermont Department of Public Service, 2010). While Vermont has already reduced its carbon emissions by more than 10% since 2005 (Vermont Agency of Natural Resources, 2008), statistics show that it is still well behind the ambitious energy efficiency goals the state legislature has set (Vermont Department of Public Service, 2011). In an effort to further reduce energy consumption, Vermont leaders have targeted transportation as a key area for improvement. The Energy Action Network, in their 2013 report outlining prospects for achieving a statewide shift to 90% renewable energy by 2050, emphasize an increased reliance on public transportation, electric vehicles, and an increase in biofuel use for heavy vehicles (Vermont Energy Investment Corporation and Energy Action Network, 2013). The Vermont Agency of Transportation emphasizes the use of public transit, pedestrian and bicycle transportation, and ridesharing as critical in reducing fossil fuel consumption in their Climate Action Plan (VTrans, 2008).

Fostering sustainable transportation in a predominantly rural state presents a unique challenge, but one vital to meeting overall goals for sustainability. Today, transportation is the largest sector by energy consumption and accounts for 34% of Vermont's energy usage (United States Department of Energy, Clean Energy In My State: Vermont, 2013), while the greenhouse gas emissions it produces makes up 47% of the state's total. Vermont's comprehensive energy plan highlights the importance of smart transportation and land use planning to both reduce demand for single-occupancy vehicle (SOV) travel and provide more efficient and convenient alternatives. It states that in order to "achieve the transformation in transportation we envision we must reshape our transportation system with better, more efficient programs and infrastructure" (Vermont Department of Public Service, 2011).

In this report, we describe our project that focused on improving sustainable transportation in Rutland County. As Vermont's second largest county by population and home to Vermont's second-largest city, Rutland has enormous need and potential for sustainable transportation (US Census, 2010). For the 15% percent of Rutlanders living below the poverty line, providing better transportation options is about more than protecting the environment: it allows them to affordably access the resources they need in day-to-day life. The urban center of Rutland already serves as a transportation and employment hub for the surrounding communities and is connected to several outlying villages by a network of rideshares and public transportation routes. We hope to offer information and suggestions that can improve the quality of the transportation options available in Rutland and improve the participation in existing options.

We recognize that sustainable transportation is more than simply getting people from one place to another more efficiently. It is a matter of establishing and improving connections in order to provide people affordable and equitable access to the resources they need. This report highlights our work in establishing three kinds of connections that we believe are critical to encouraging sustainable transportation.

1) Connecting Planners to Information: Mapping Commutership

A transportation system that fits the needs of its ridership is essential. In order to create such a system, planners at the Rutland Regional Planning Commission (RRPC) and in each of the Rutland County townships must be well-informed of those needs. We have organized and analyzed publicly available data using Geographic Information Systems (GIS) to provide planners with a series of maps that show commuter flows into and out of each of Rutland's townships. These maps can be used to understand and convey transportation needs for future proposals. Additionally, we have used these maps to identify trends in commutership and offer suggestions to the RRPC for key areas of improvement. In this report, we outline the methods by which we produced and analyzed the maps, providing data and tools that allow our work to be repeated for other counties and townships in Vermont. We then discuss the trends we discovered through that analysis, and conclude with a brief discussion of the limitations of our work, our suggestions, and implications they may have for the future.

2) Connecting People to Information: Creating a Comprehensive Vermont Transportation Map

In order to engage in sustainable transportation, even when suitable options are available, riders need to understand how to use these resources. Through our work in Rutland, we realized that many potential riders often have to travel outside their immediate transportation region; however, it is currently very difficult to determine how to connect between different transit providers. Vermont's public transportation providers each have their own maps and websites. Although information on routes and schedules is available for each separate region, finding information in order to plan travel between these service areas is very difficult. In order to connect commuters to the information they need and make it easier for them to travel from county to county, we collected and published the routes of all of the 10 transit companies in Vermont. In this report, we describe the methods used in collecting and producing a single map, discuss how the map can be implemented and used, and briefly discuss how we hope it will aid Vermont's sustainable transit network in the future.

3) Connecting People to People: Encouraging Participation in the Way To Go Challenge

While these maps are a way of making transportation information accessible, they only matter if people *decide* to use them. Thus, motivation is a key aspect of engagement in sustainable transportation behaviors. In this report, we describe how we sought to connect with people and motivate them to participate in the week-long Way to Go Challenge. The Way to Go Challenge is a statewide initiative to encourage a shift towards sustainable transportation. We hope that getting people to participate in the challenge will in turn allow them to see that sustainable transportation is easy, convenient and possible; these realizations will encourage them to continue practicing sustainable transportation behaviors in the future. We describe how we planned and carried out a community outreach campaign to promote the challenge and describe the results measured by the published participation statistics.

We hope that the information and resources we provide as well as the methods we have used will continue to be used to encourage sustainable transportation in the future, in Rutland County and beyond.

KEY TERMS:***Commutershed-(n.)-***

A geographic region that represents frequent daily travel to and from a destination by a population, such as the travel between residences and places of employment. Similar to a watershed, which outlines the land area which a given point or body of water drains, a commutershed can be used to visualize the magnitude and direction of commuter flow that a given area draws.

Live-Work Community-(n.)-

A community in which a relatively high proportion of residents also work. These areas are typically characterized by a mix of residential, commercial, and industrial developments, as well as relatively high population and employment density. Live-work communities are often associated with increased potential for sustainable commuting, as commutes tend to be shorter and may not require SOV travel.

1) CONNECTING PLANNERS TO INFORMATION: MAPPING COMMUTERSHIP

Background

The RRPC promotes and supports the Marble Valley Regional Transit District's (MVRTD) public transportation services. MVRTD works hard to provide the best, most equitable, and most convenient service to their entire service area, while carefully balancing a tight budget and limited manpower. While there is a wealth of data at a geographic system level that would be useful for planners of both organizations to make informed decisions, much of it needs considerable processing and analysis before achieving that level of clarity. In addition, there are barriers to participation in sustainable transportation by the public that can only be observed and understood at the ground level. It is our hope that the geographic data analysis and site-specific investigations we conducted will assist the RRPC and MVRTD in making sound decisions for sustainable transportation in the future.

Using GIS software, we created a set of maps for the RRPC that draw on the U.S. Census Longitudinal Employer-Household Dynamics (LEHD) dataset to delineate Rutland County's various **commutersheds**. Understanding how commuters flow through these areas and understanding the connections between commuter sinks (areas with high density of employment opportunities) and commuter sources (populated residential areas) can help planners encourage fewer, shorter commutes; create transit systems that more effectively connect workers to their places of employment; and recognize the need for better interfaces with their counterparts in other regions. For each of the 27 towns in Rutland County, we made a map that answers each of the following questions:

1) Where do people who live in town work?

2) Where do people who work in town live?

We also produced a map that helps identify **live-work communities** within Rutland County as potential targets for local bicycle and pedestrian commuting. When combined with a map of existing driving roads, public transportation routes, and park and ride locations, our maps provide valuable information about potential bus routes and carpool groups within the Rutland County commutershed. Because the commuter data include information about commutes to New York and New Hampshire, our maps provide information about cross-state transit links as well.

We also used this information to identify areas for further investigation with the goal of increasing sustainable transportation access to Rutland county commuters. In particular, we looked for consistent trends in commutership towards unserved or underserved areas, with either well-defined, commuter-dense origins or other factors, such as long distances that would make public transportation

more attractive to potential commuters. We then visited these areas to get a better sense of the current attitudes of commuters towards existing transportation options; the types of informational, behavioral, and infrastructure barriers that prevent these community members from commuting with non-SOV options; and a better understanding of their transportation needs. These studies included informal interviews with transit operators, township officials, and brief surveys (see Appendix I) and interviews with commuters who travel along the commutes of interest identified by our work with the GIS. The results of this research have been packaged to facilitate ease of use and presented to the RRPC. Further, our methods, model for automated data processing, and data itself were packaged to create a commutershed analysis kit that has been made available online at the Vermont Center for Geographic Information's website so that other resource-strapped transportation and planning commissions throughout the state of Vermont can easily perform similar analyses in the future.

Methods

Data Collection, Processing, and Preparation

A number of steps are required to transform the Census LEHD data into a form that is easy to read and useful to transportation and regional planners. The LEHD dataset, last updated in 2011, records residence-workplace location pairs for each household that participated in the census. For privacy reasons, these data are aggregated on the census block level, where census blocks vary in area based on population density. For the purposes of this study, we included all LEHD pairs for Vermont, New York, and New Hampshire in order to capture possible inter-state commuter flow (LEHD data were not available for Massachusetts). We obtained geographic data for roads and township boundaries from the Vermont Center for Geographic Information's website, using the Esites dataset of roadways, which is maintained for emergency response purposes.

To maximize the impact of our work, we have prepared a package of data for Vermont, New York, and New Hampshire that has been processed as far as possible (a target township must be specified to continue the analysis), and procedures for using these data to replicate our analysis across any township in these states (See Appendix II). We also included in this package an automated model for use in ArcGIS that will perform the additional processing steps after inputting the desired township. This model will make it easier for other planners to follow in our steps and gain valuable information for their decision making process. Especially in resource-strapped areas, packaging this information in an easy-to-access and use process makes it faster and more convenient to access information that is critical for good planning decisions. Scarce resources make good information all the more critical in determining how those resources can be distributed to provide the greatest impact.

Inter-Township Commuter Analysis

The commutershed maps (e.g., Figures 1 and 2),¹ overlaid with the existing transit and road networks, can highlight opportunities for increasing ridership amongst the towns of Rutland County. Examining popular commute destinations and origins for each town, distance and number of potential riders are likely to be the determining factors in promoting ridesharing or participation in public transit. As the distance to the destination increases, the cost of driving alone increases, and is thus more likely to overcome the implicit fixed cost of the hassle or perceived inconvenience of engaging in non-SOV transport. These positive effects multiply as

¹ See Appendix IV for all 54 township commutershed maps.

the number of potential riders increases, so we considered implementing a threshold for the minimum values for considering implementing rideshares or extending bus routes; however, these thresholds will vary based on township population. For example, 200 commuters to a single destination are much more likely to justify altering a bus route for a small community, like Benson Township, than for a large one like Rutland City. For this reason, we summarized the top 10 origins and destinations by percentage of total commutership in each of the townships of interest.

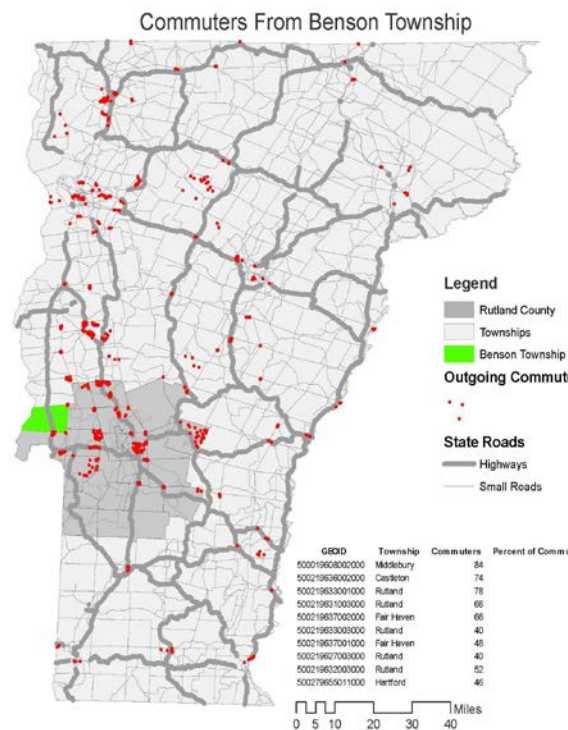


Figure 1. Commuter flow out of Benson Township. Here, and for all subsequent commutershed maps, commuter destinations outside of the township are aggregated by census block and represented by a single dot per commuter. Listed Townships refer to top 10 commuter destinations by census block.

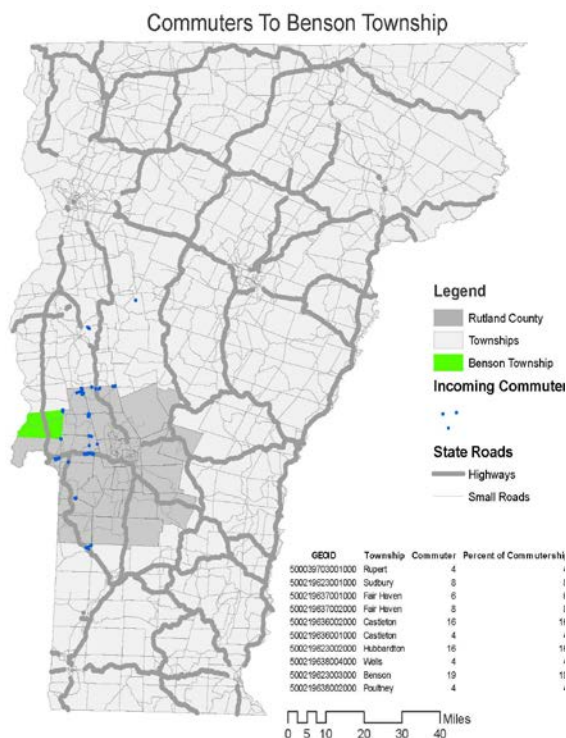


Figure 2. Commuter flow into Benson Township. Listed Townships refer to top 10 commuter origins by census block.

Fifty-four of these maps were created showing commutership into and out of each of the townships within Rutland County. With the exception of Rutland, West Rutland, Killington, and Brandon Townships, very few of the townships within Rutland County showed significant in-flows of commuters. Rutland Township was consistently a top destination for commuters, as would be expected, however Killington was a surprisingly important commuter sink for nearly all of the townships. In particular, Benson, Brandon, Castleton, Fair Haven, and Poultney, shown in Figures 3-7, showed heavier flows of commuters traveling west along Route 4 to work within Killington Township.

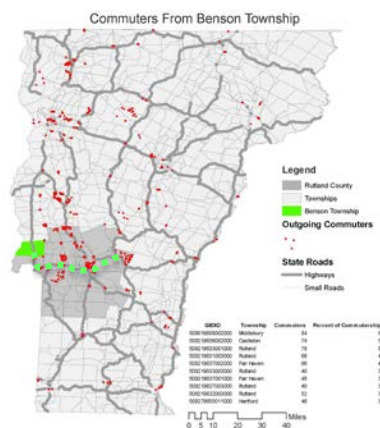


Figure 3. Commuter flow out of Benson Township..

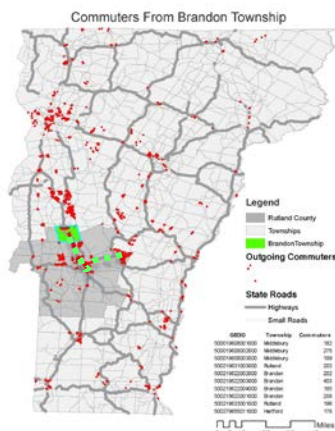


Figure 4. Commuter flow out of Brandon Township.

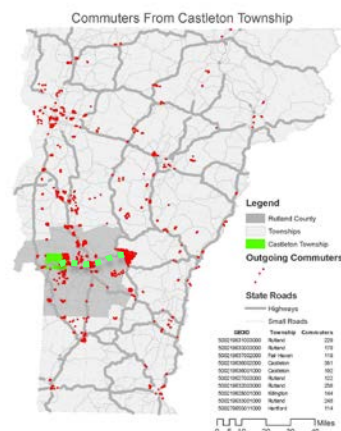


Figure 5. Commuter flow out of Castleton Township.

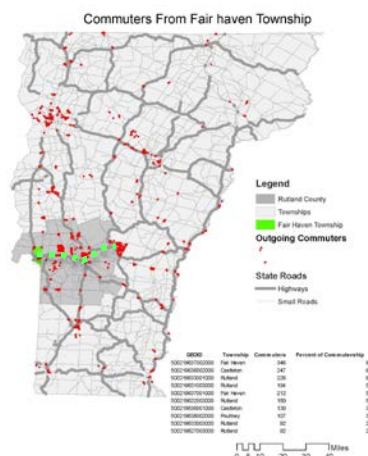


Figure 6. Commuter flow out of Fair Haven Township.

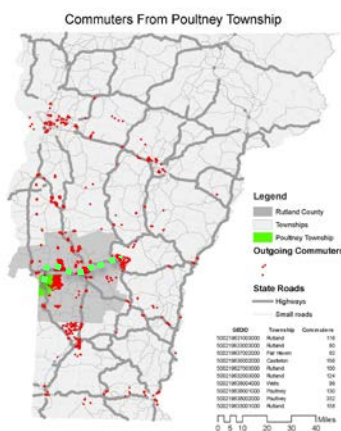


Figure 7. Commuter flow out of Poultney Township.

The most significant trend, however, was a heavy flow of commuters north and south on Route 7. Out of the Townships evaluated, Benson, Brandon, Castleton, Danby, Clarendon, Mt. Holly, Pawlet, Pittsford, Poultney, and Fair Haven townships, displayed in Figures 8-17, all show commuterflow along Route 7 ranging from heavy employment in Burlington in the north and Rutland town and City in the center, to moderate employment in Middlebury in the north and in Manchester to the South. While Census blocks in the Burlington area are not often recognized in the top 10 commuter destinations for any one township, the consistent distribution of long-distance commuters to Burlington from many townships in Rutland county certainly adds up, and when combined with commuters to other destinations North on Route 7 and the high connectivity of the CCTA transit system providing convenient access to the greater Burlington area, the connection of the MVRTD to these destinations becomes all the more important.

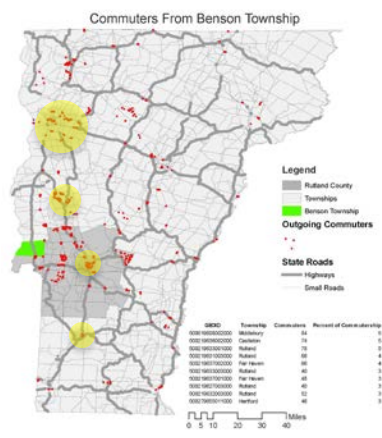


Figure 8. Commuter flow out of Benson Township.

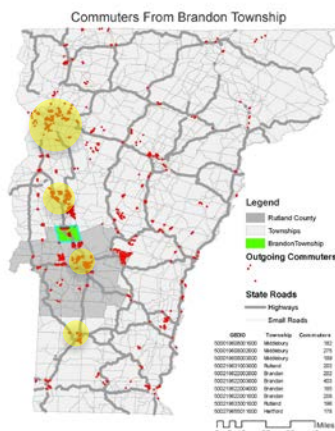


Figure 9. Commuter flow out of Brandon Township..

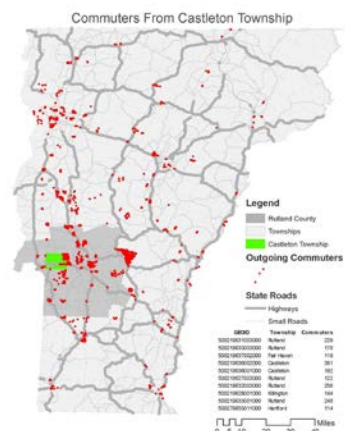


Figure 10. Commuter flow out of Castleton Township.

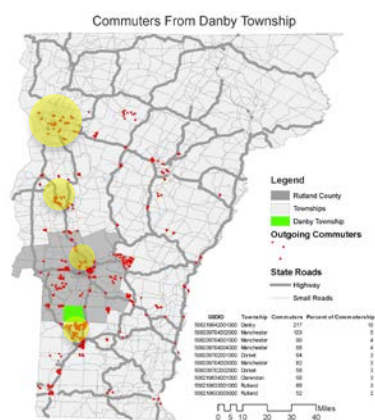


Figure 11. Commuter flow out of Danby Township.

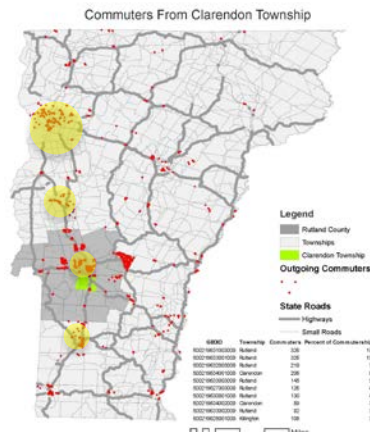


Figure 12. Commuter flow out of Clarendon Township.

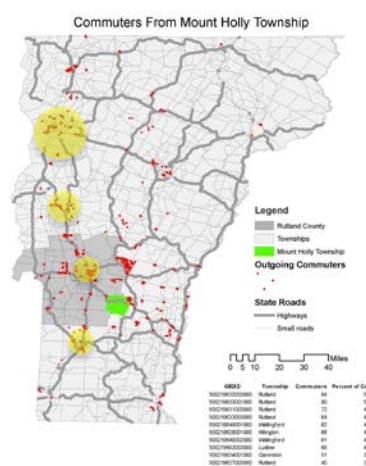


Figure 13. Commuter flow out of Mount Holly Township.

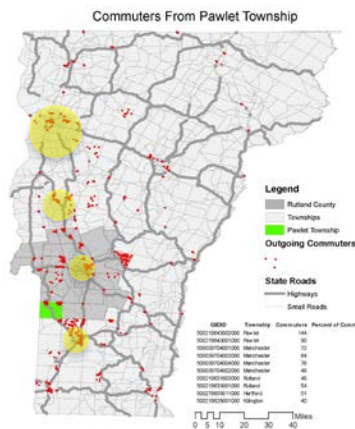


Figure 14. Commuter flow out of Pawlet Township.

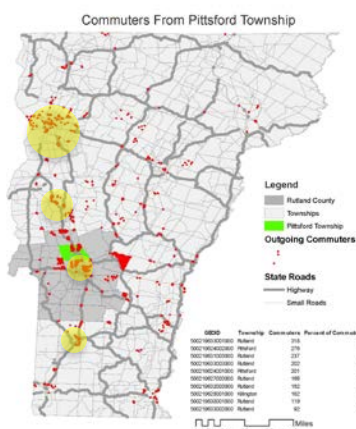


Figure 15. Commuter flow out of Pittsford Township..

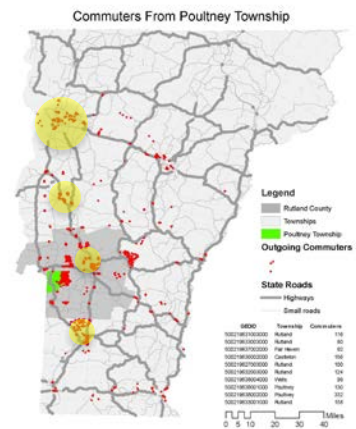


Figure 16.Commuter flow out of Poultny Township..

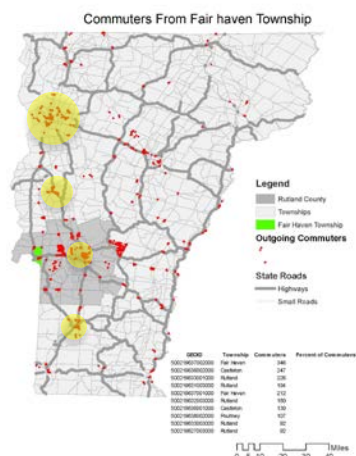


Figure 17. Commuter flow out of Fair Haven Township.

Looking further beyond the county borders, many townships, particularly on the western side of the county, have relatively small, but consistent commutership to Montpelier. Some of these townships included Wallingford, Poultny, Fair Haven, and Clarendon, shown in Figures 18-21. These longer distance commutes may make public transportation more attractive if it were available and warrants further discussion and investigation.

In addition, Pawlet, Mt. Holly, and Benson Townships, shown in Figures 22-24, showed a high percentage of commutership along Route 7, and some amount north and east to Killington; however, none of these townships is currently able to interface with the existing public transportation system. Their locations at the edges of the county means that they have relatively high travel costs for SOV travel, which may make them more enthusiastic and likely to participate in ride shares or public transit if it was made available to them. Connecting these remote largely residential townships to the transportation network may provide them with more affordable access to necessities.

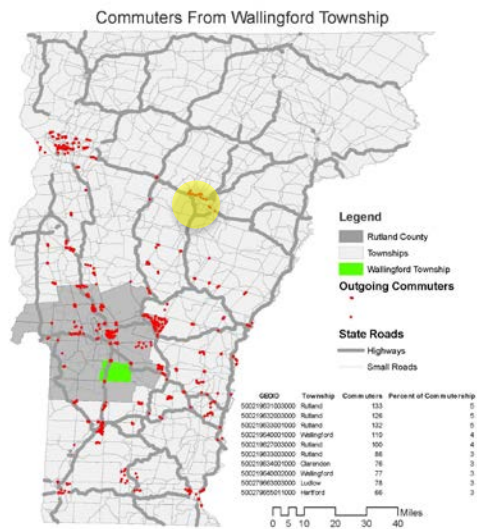


Figure 18. Commuter flow out of Wallingford Township.

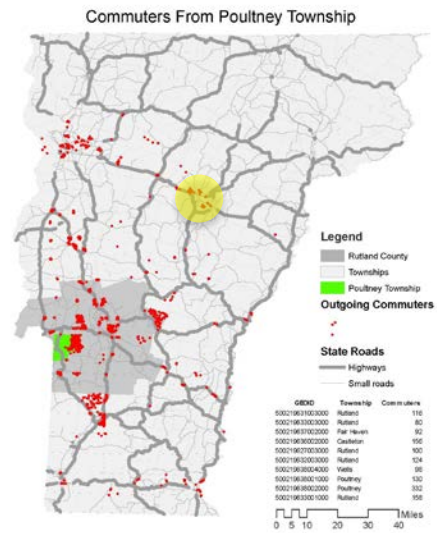


Figure 19. Commuter flow out of Poultney Township.

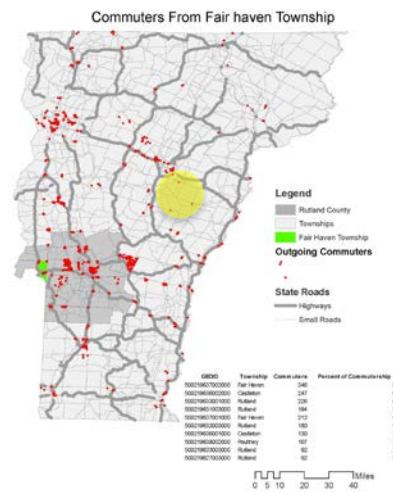


Figure 20. Commuter flow out of Fair Haven Township.

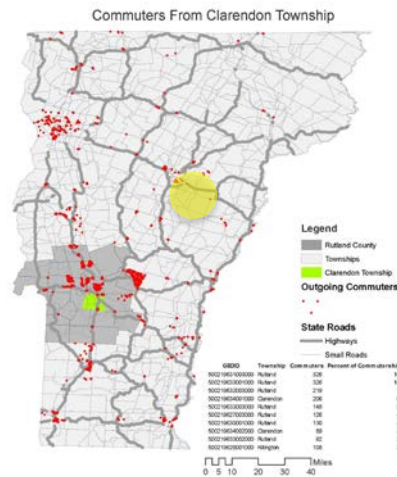


Figure 21. Commuter flow out of Clarendon Township.

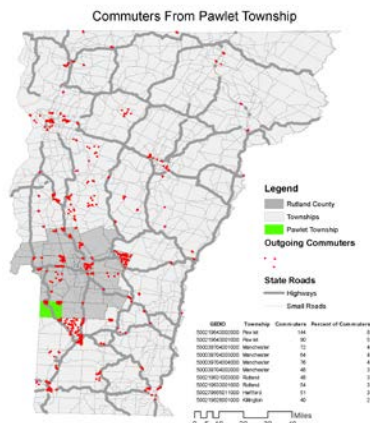


Figure 22. Commuter flow out of Pawlet Township..

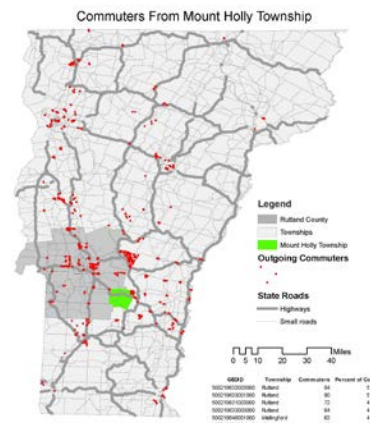


Figure 23. Commuter flow out of Mount Holly Township.

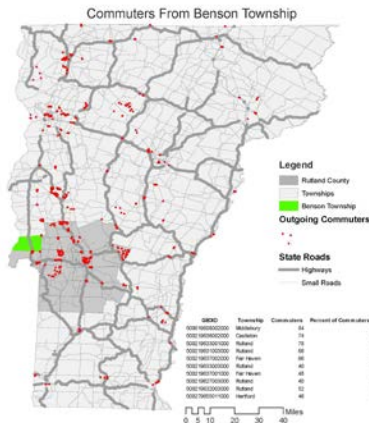


Figure 24. Commuter flow out of Benson Township.

Finally, clusters of commuters who travel between all Rutland towns (collectively) and distant areas throughout Vermont, New York, and New Hampshire were identified by displaying an overlay of all individual commutershed maps, and weighting them based on density and magnitude of the distance traveled, shown in Figure 25.

Distance-Weighted Commutership From Rutland City

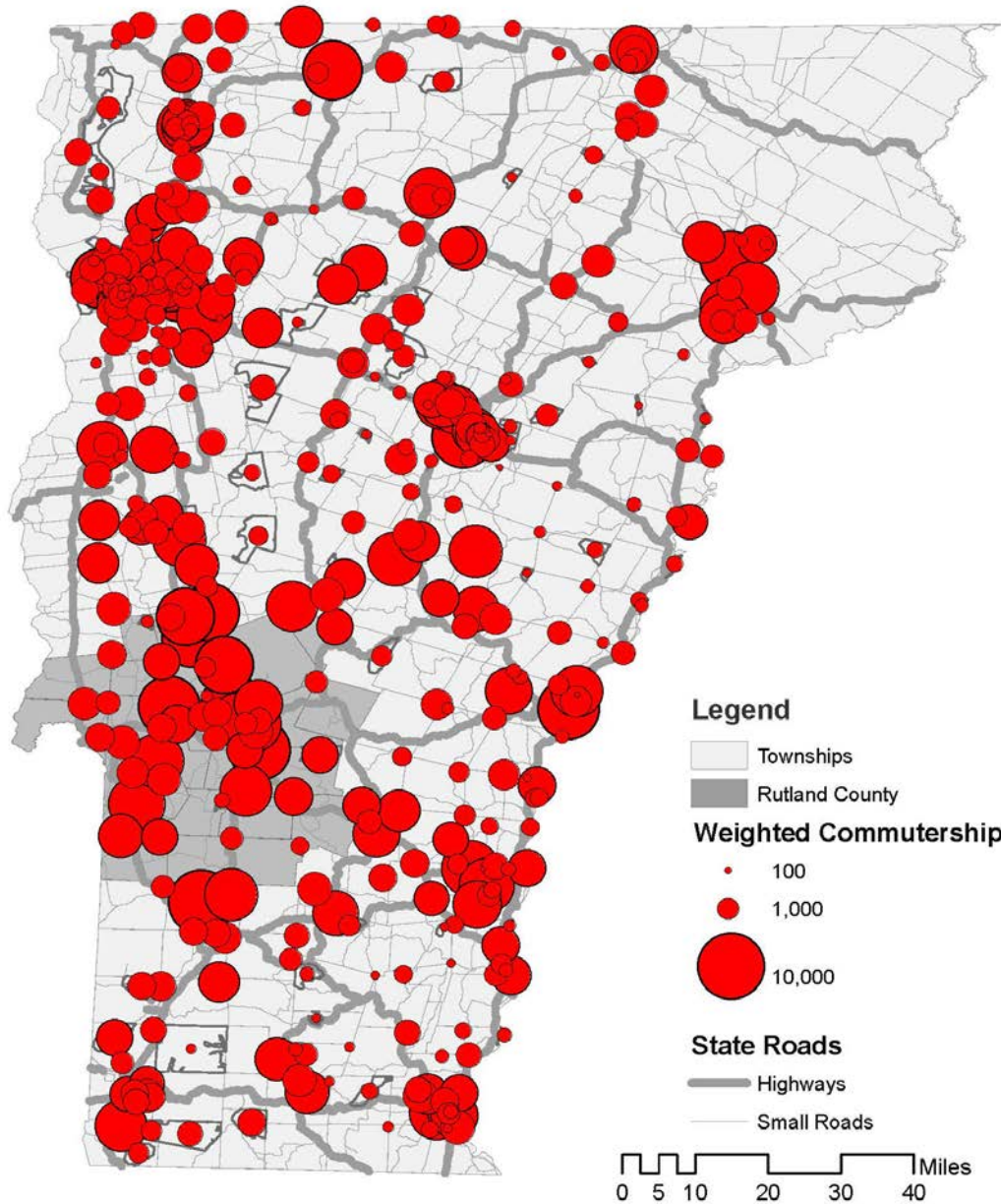


Figure 25. Potential for long-distance sustainable commutership. Commuter destinations outside of Rutland County are aggregated from all Rutland County townships, and weighted by distance from the Transit Center in downtown Rutland City. Weighted commutership units shown are number of people commuting to a destination multiplied by number of miles.

Live-Work Analysis

In addition to the line of analysis detailed above (helping to understand inter-township transportation demands), we used the LEHD data to identify areas with significant potential for bike and pedestrian development. Enhancing existing live-work communities, or for our purposes, areas with commuters with LEHD origins and destinations within the same township as their residences, should be an important priority for transportation planners.

We analyzed live-work communities within Rutland County and the whole state of Vermont by displaying dot density equal to the number of commuters whose workplace and residence were within the same township, displayed in Figure 26. Commuters were aggregated by the census block of their workplace, and the census blocks with the top 10 densities of local commuters were identified within both Rutland County and Vermont State excluding Rutland County. All of Rutland County's top 10 census blocks for this type of live-work communities were within Rutland City, all with more than 500 local commuters. Statewide, the communities with the highest live-work populations were clustered around Burlington and Chittenden County, however, 3 of the top 6 live-work populations were within Rutland Town. Within the greater Rutland County area, there were clusters of live work communities in Brandon Township, Pittsford, Killington, and around the intersection of Poultney, Ira, and Middletown Springs Townships. Outside of Chittenden County, there is nowhere else in Vermont that can rival Rutland County's density of relatively large, distinct live-work communities.

By identifying and developing strategies for these communities, planners can increase the feasibility of active transportation and help to create positive growth resulting in tight-knit, resilient communities, healthier residential populations, greater and more equitable access to amenities, and reduced dependence on fossil-fuel based modes of transportation and their associated health and environmental risks (Saavedra and Budd, 2009, Litman 2013). A simple operation selecting commuter entries that originate and terminate within the same town² can identify live-work communities throughout the study area that may benefit from the development of better active transportation infrastructure such as sidewalks, bike path networks, regulation to reduce traffic speeds, and education or public awareness campaigns. Identifying these opportunities and then promoting bike and pedestrian transit in these areas presents perhaps the most cost efficient and environmentally friendly ways to increase equitable access to crucial amenities in the long run, thus the targets highlighted by this analysis should be considered when planning for the future.

² In GWGHNWNH.dbf select "town"= "town_1", export, Summarize, and join to a Vermont State Census Block shapefile

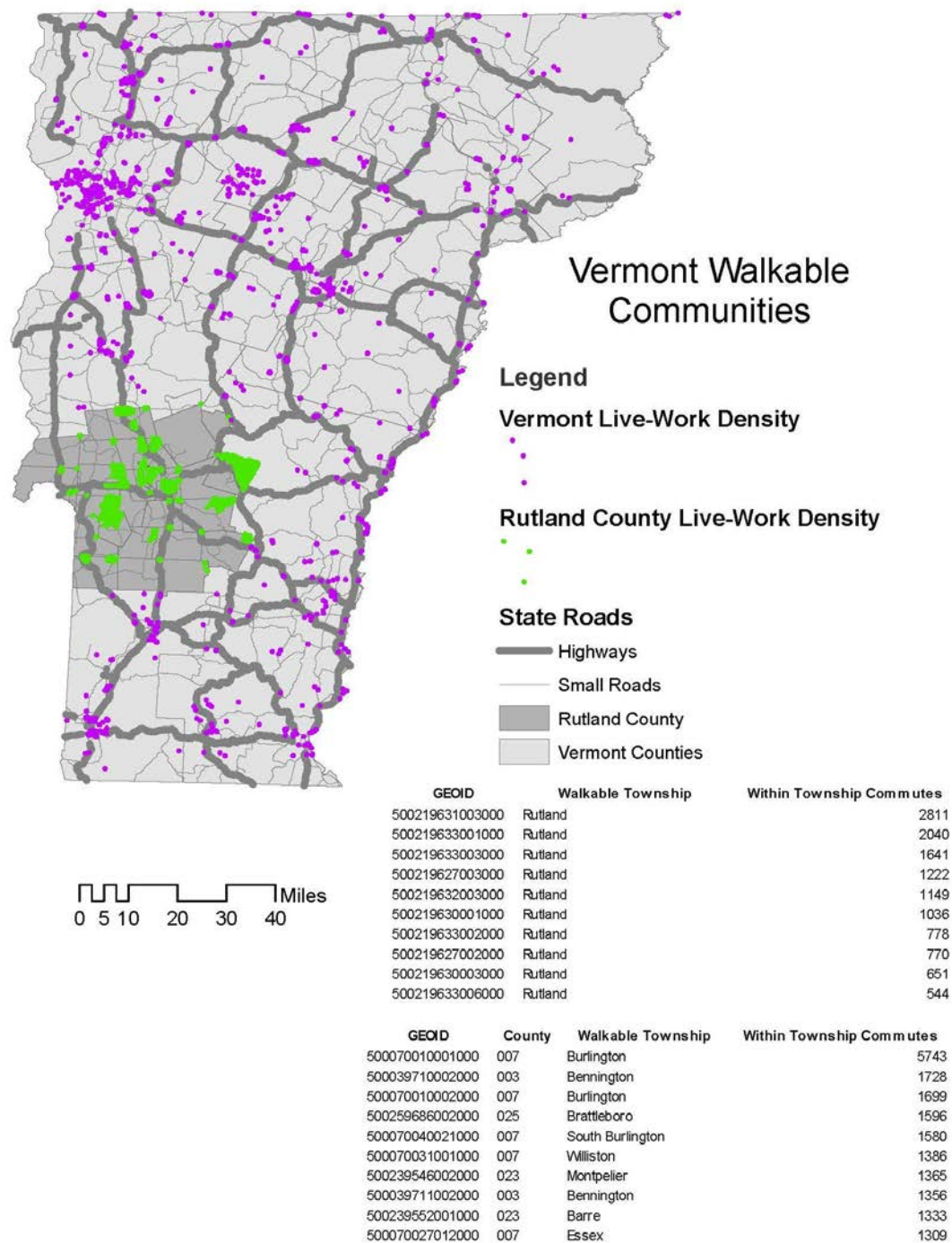


Figure 26. Walkable Communities in Vermont. Aggregated by township and Census block, each commuter that works in the same township as they live is represented by a single dot.

Local Observations

After identifying areas with high sustainable transportation potential for further investigation, it is necessary to develop a better understanding of the factors that will affect the realization of that potential in each of the target communities. Of particular interest to our study were commuters to and from all townships that traveled north on Route 7 and commuters to and from Killington Township along Route 4. We also wanted to focus on commuters that lived and worked within Rutland City, Killington, and Brandon townships. While time constraints limited the depth to which we were able to carry out this investigation, we began by establishing contact with representatives of the respective township planning committees. We hoped to be able to use these contacts to help distribute and collect surveys and identify commuters that we could talk to who participate in the commuter flows of interest, however our limited time was not sufficient to complete this task.³ We explained and discussed some preliminary findings, and asked for their insights about these trends at a monthly joint meeting of the regional Transportation Council. In addition, we interviewed bus route operators and, Minga Dana the executive director of the MVRTD, which added some perspective to the conclusions we draw in the discussion section.

Discussion

East-West Commutership

Through examining the commutersheds for the 27 Rutland townships, we identified three areas as likely targets for further study and eventual action. The first two are two consistent axes of commutes across Rutland township that served a large portion of commuter routes, each of which are currently served by two separate transit lines. The East-West axis connects the low-population density western half of Rutland County to the employment-dense urban center, and the west+urban center with Killington Township in the east, and is served by the Fair Haven Route and the Diamond Express Route. This commuter route is relatively short distance, which might not incentive use of public transportation; however, conversations with Minga Dana and a representative from Killington Township revealed that there are several factors that might encourage the use of public transit along this route, especially eastward towards Killington. One reason may be road conditions during the winter months, as the pass into the Killington valley is often treacherous. This concern for safety deters many drivers and makes taking public transportation all the more attractive. Additionally, many of the commuters to Killington Township are members of low income families who cannot afford the high property values and must live farther west. These families are also more likely to use The Bus due to financial pressure. Dana and the representative from Killington Township disagreed about the reason for the popularity of the Killington line. Dana suggested that the acknowledged popularity of the Killington route was due to relatively wealthy Bostonians who travel north on vacation and are accustomed to using public transportation, but this was met with skepticism by the Killington representative. After identifying compelling reasons for travel along the East-West axis, we suggest that the two connecting routes be joined to facilitate travel through Rutland, especially during the morning and evening commuting period. Currently, riders need to transfer at the Transit Center in Rutland, which increases their commuting time.

North-South Commutership

The large commutership that we identified traveling along Route 7, in particular, north to Middlebury and Burlington, make improving the existing service along that road a priority. Daily

³ For survey questions, see Appendix I

commuters to Middlebury and Manchester, who travel through Rutland City are traveling 34 and 32 miles each way, and spending \$11.02 and \$10.28 on fuel per commute, respectively, which amounts to a yearly fuel cost that is more than 10% of the average Rutlander's annual income.⁴ For the significantly more numerous commuters to Burlington, who travel around 68 miles one way, and spend more than twice the amount on fuel, there is an even greater incentive to participate in sustainable transportation. Currently, the MVRTD, in partnership with Addison County Transit Resources (ACTR) and its partnership with the Chittenden County Transportation Authority (CCTA), provides service to all three of these destinations along Route 7; however, there is need for improvement if that service is to effectively serve commuters.

We learned firsthand that miscommunications between the transportation companies can make it difficult for people to use transportation between their service areas. On our way to present our preliminary commutershed maps at a monthly Transportation Council meeting in Rutland, we discovered that a bus from Middlebury to Rutland that was scheduled on one company's website as leaving at 4:45, did not actually leave until 5:30. The basis of this mistake was that differences in the weekday vs. Saturday ACTR services had not been posted by the MVRTD, an error that can be easily fixed. It is illustrative, however, of the kind of information barrier that can prevent participation, even by those who are motivated to make whatever effort necessary to use public transportation services.

In addition to a more coordinated exchange of information, better serving the heavy commutership along Route 7 will require adjustments to the current bus schedules. Assuming working hours are from 9:00 A.M. to 5:00 P.M., commuters from Rutland County need to leave Rutland at 5:30 A.M. in order to arrive in Burlington before work starts. This commute involves a 30 minute layover in Middlebury, which is almost 30% of the total driving time and presents a significant inconvenience for potential commuters into Burlington. Furthermore, it is not currently possible to return to Rutland from Burlington after the work day. Buses leave Burlington at 4:40 P.M. and arrive in Middlebury just as the last bus leaves for Rutland at 6:00 P.M. Aside from the tight timing, making the prospects of catching the Rutland Connector uncertain at best if the Burlington Link is running late, the 4:40 P.M. departure time from Burlington is before many people finish their work day. In order to support round-trip commuting all the way north on Route 7, the MVRTD should consider running a later bus that can pick up commuters leaving Burlington at 5:20, and arriving in Middlebury at 6:40.

Long Distance to Montpelier

In mapping commuter destinations from origins in Rutland County townships, we noted consistent, low volumes of commuters traveling northwest to Montpelier. Particularly concentrated in the western and central townships of the county, these commuters are almost certainly driving through Rutland City to make the 68 mile commute to Montpelier along Route 4 because of the necessity of passing through the Green Mountains. While each of these small groups of commuters may be too isolated in their home communities to connect with each other, the length of their daily commute provides a large incentive to participate in sustainable transportation. Every day, each of these commuters spends 3 hours driving, and approximately \$22.40 on gasoline alone, which amounts to \$5,824 per year, the equivalent of 22% of the average individual income for Rutland County. There is currently no public mode of transportation between Rutland and Montpelier that is useful to commuters. Though public transportation connects from Rutland to Montpelier through Hartford and Burlington, the routes

⁴ Assumptions: 20 mpg and \$3.25 / gallon

are too long to enable a commuter connection. Using Rutland city as a central hub, however, commuters could engage in a vanpool, such as those supplied by vRide in cooperation with the Vermont Agency of Transportation, and drastically reduce commuting costs with little change in commuting time and almost no deviation from their original route. Encouraging this cooperation by generating awareness and connecting Rutlanders who commute the long distance to the capital is a low-risk way of boosting sustainable transportation. In the future, depending on participation levels, it may also make sense to connect the MRTVD to the Stagecoach Transportation Services. This would require a 15-minute deviation to the Killington Route, but would provide even more efficient and affordable transport to Montpelier.

Limitations of Mapping Data

The level of aggregation of the LEHD data serves as a major obstacle to the depth and specificity of the conclusions that we were able to draw from the commutershed maps. Privacy and security concerns limit the resolution of all census data to the census block level, which varies in geographic area based on population density. For this reason, we visualized the data using dot-density diagrams that randomly distributed a number of points within each census block equal to the number of commuters originating or arriving there. This reduced visual error from the relative impacts of differentially sized areas: higher dot-density shows higher concentration of commuters independent of block size. This level of aggregation seemed to be sufficient to show discernable patterns at the inter-township/intra-county level and larger scale, but lacks the resolution to give confidence in intra-township patterns in commuting that would be especially relevant to township planners. In some cases, such as Killington township, where half of the township area is a single census block, but development within that block is in a relatively small fraction of it, (the rest of the block is state forest), we were able to infer more accurate distribution of commuters. As these maps are used in the future, we hope that each of the township planning boards will combine them with their own knowledge of their area and development patterns to identify and infer additional information that will increase the maps usefulness as tools for township-level planning.

Further Work

It is our hope that the insights we have gleaned through the investigation of the interconnection of the Rutland County commutersheds will be helpful to the MVRTD and township planners in implementing improvements on their sustainable transportation network; however, we also hope that our methods, pre-processed data, and automated model will be used by other counties and in the neighboring states. One of the important lessons that we identified from producing and evaluating Rutland County's commutersheds is that county borders and transportation district jurisdictions do not tend to neatly agree with commuter travel. The degree to which commuters travel across these boundaries only emphasizes the need for comprehensive planning by neighboring transit providers in order to create an efficient network of connections that has the capacity to serve the commuting needs of their communities on both sides of geographic borders. By providing these tools and enabling transit providers across the state to more easily understand their commutersheds, we hope to encourage the development of better transit connections at the intra- and inter-district level.

2) CONNECTING PEOPLE TO INFORMATION: CREATING A COMPREHENSIVE VERMONT TRANSPORTATION MAP

Background

There are 10 major organizations that plan and provide public transportation in the state of Vermont. The Marble Valley Regional Transit District (MVRTD), which operates in Rutland County, Addison County Transit Resources (ACTR), and the Chittenden County Transportation Authority (CCTA) may be of particular interest to those commuting to and from Rutland County. We hoped to reduce the barrier for participation in public transportation throughout the state of Vermont by creating a single, easy-to-use and interpret map of the intrastate network of public transportation systems to be published on transit providers' websites and in printed forms for potential riders.

Lack of accessible information can be a critical barrier to engagement in sustainable transportation, even when a number of effective sustainable transport options are available. While there is much information on Vermont's public transportation options, we found that it was difficult for riders to understand how it all fit together. Before our study, each of Vermont's regional transportation organizations had its own set of maps and schedules that showed local transportation routes with widely differing levels of accuracy, clarity, and accessibility; however, a commuter didn't have the information needed understand how these individual networks were connected beyond county lines throughout the state. Planning travel between Vermont's network of transit providers presented a significant inconvenience to the rider. Therefore, we worked to provide a comprehensive map showing all the public transportation routes in Vermont to help promote participation in Vermont's public transportation system. As Litman (2003) mentioned in his article, conventional decision-making assigns problems to different agencies with narrow responsibilities; however, optimal solutions must be comprehensive. The purpose of making this map is to make the information about public transportation in Vermont more comprehensive and accessible to Vermonters. We compiled the existing resources from each transit provider together in a single map to show all existing transit routes, transfer stops between regional networks, and park-and-ride locations in the state. This map was then linked to the external websites of the individual transit companies to direct people to route schedules and additional stop information in order to help them plan their routes. We have contacted the 10 transit organizations and sent the maps to their planning committees for use on their websites, as well as for including it in printed brochures.

Methods

Our group started by contacting the 10 local transit providers and requesting the GIS shapefiles of their routes. As Figure 27 shows, these 10 organizations are GMTA (Green Mountain Transit Agency), CCTA (Chittenden County Transportation Authority), RCT (Rural Community Transportation), ACTR (Addison County Transit Resources), STS (Stagecoach Transportation Services), AT (Advance Transit), MVRTD (Marble Valley Regional Transit District), CRT (Connecticut River Transit), GMCN (Green Mountain Community Network), and DVTa (Deerfield Valley Transit Association). In communicating with these providers, we found that different organizations have different amounts of resources they can allocate toward maps and mapping projects. For example, ACTR, AT and MVRTD have in-house GIS specialists who sent their GIS shape files. CCTA and GMTA referred us to a company called Tran Systems in Utah, which helps them manage their GIS data, including the shapefiles of their bus routes and

stops. DVTA, RCT and Stagecoach did not have GIS shapefiles of their routes. Additionally, DVTA told us that VTrans (Vermont Agency of Transportation) is working on GIS shapefiles now. After contacting VTrans, they told us that the Public Transit Section currently has issued a Request For Proposals for the development of GIS data for all providers in the state, which will allow them to do trip planners for all routes in the state on Google Transit by the end of August this year.



Figure 27. Regional Transportation Providers operating in Vermont. Image source: Vermont Public Transportation Association Website

Results

Figure 28 shows the summary map of all bus lines for which we received information. The bus stops where passengers can connect to other provider's routes (i.e., transfer stops) are also shown. We were able to digitize all the bus routes of CCTA, GMTA, MVRTD, ACTR, RCT, AT, and DVTA. The map also contains the park-and-ride sites near each bus stop, so that potential passengers could find where they can park their cars and ride a bus to complete their journeys. This map can be viewed online at <http://www.cs.middlebury.edu/~jiayiz/>. Figure 29 shows that our online version of this map is interactive, displaying hyperlinks redirecting the rider to detailed information (including route maps and schedules) associated with each carrier when the passenger clicks on any of the bus lines in the legend of the map.

Vermont Transit Lines

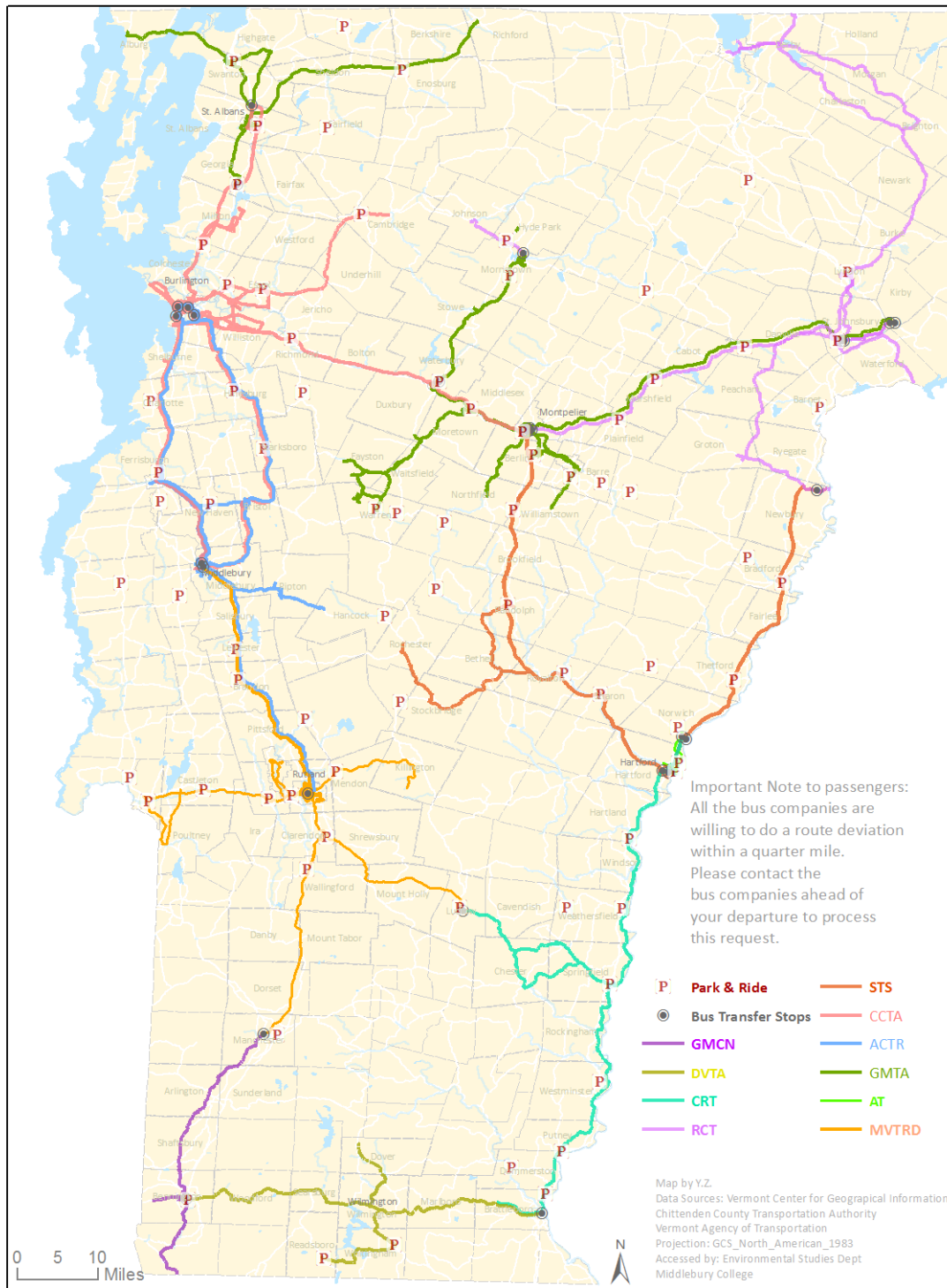


Figure 28. The statewide map featuring public transportation routes. According to our research, all the transit providers are willing to provide a route deviation, typically 0.25 miles from the published route. Passengers need to call the bus company ahead of time to make the adjustment possible.

Vermont Transit Lines

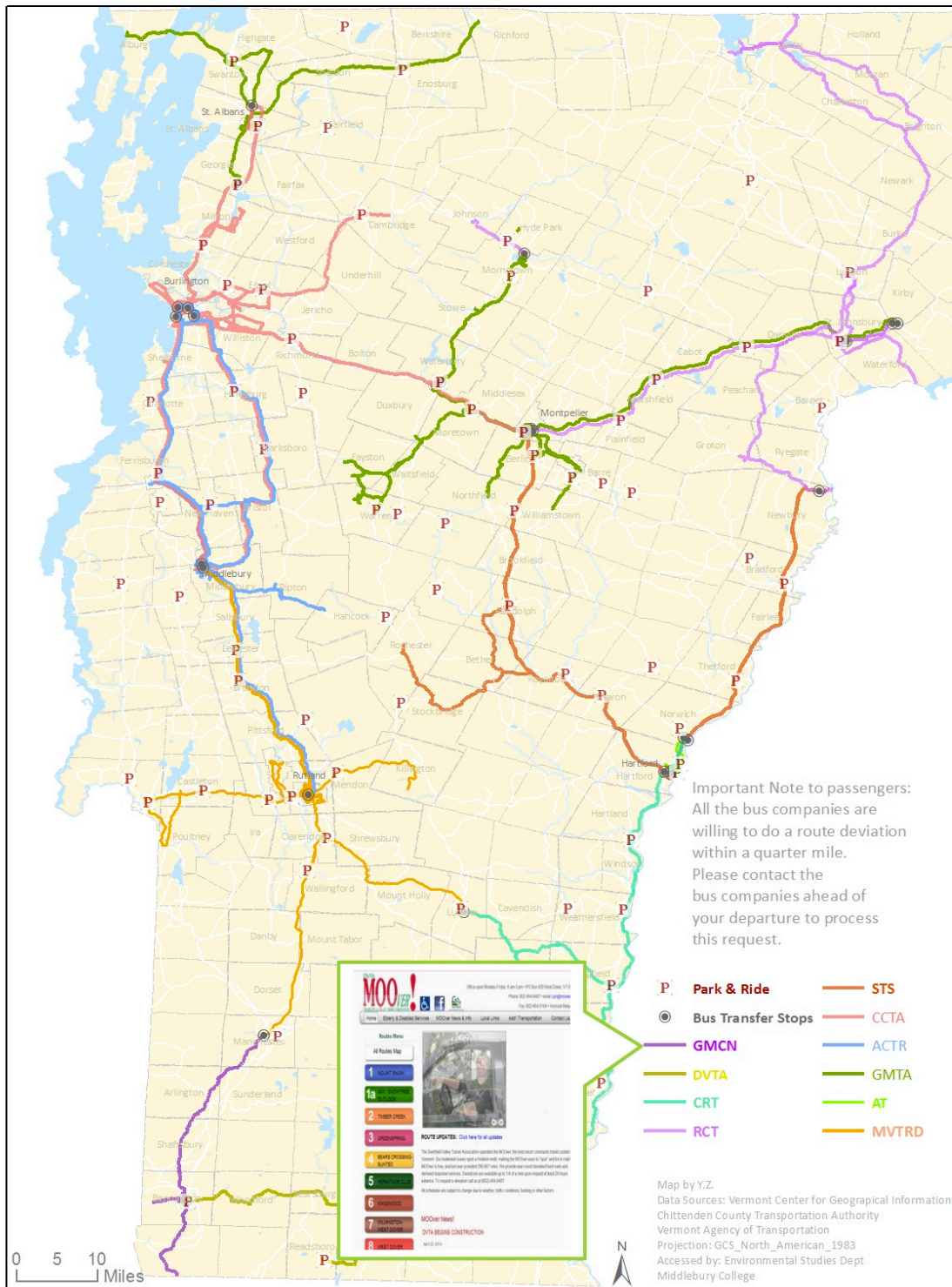


Figure 29. Screen capture from our interactive online map. When clicking the legend, the user will be directed to the individual website of the corresponding bus company.

We also developed a tool that provides information that helps make transfers more efficient. If the potential passenger clicks on any of the transfer stops on our interactive map, a new tab will redirect that passenger to the bus schedule of the routes that pass that stop. For example, if the passenger wants to transfer from ACTR to MVTRD at the Rutland downtown stop, she or he could see the bus schedules of both MVTRD and ACTR popping up to show at what time she or he could make the transfer.

Discussion and Future Work

We hope that the effort we have invested in producing, publishing, and distributing the first public transportation map that integrates all of Vermont's major transit providers will reduce the difficulties that Vermonters previously faced when planning inter-county travel. By making information about park-and-rides, bus routes and transfer stops more available and providing links to the necessary schedules, we hope that we can encourage more Vermonters to leave their cars at home or in the park-and-ride lot, hop on the bus, save themselves money, and reduce their carbon footprint. Ideally, the initiative to integrate all of Vermont's public transit providers into familiar online travel planning software such as Google Transit, which has already been started by VTrans, will further decrease the information barrier and the hassle of planning travel on public transportation.

Further work could be done to include all the bus stops on the state's bus routes. Given that most of the bus companies only have their bus stops shown on schedules, to provide a complete maps of all the bus stops would be very helpful for future riders to find the most convenient bus rides. If the maps we made could be uploaded into Google Transit in the near future, the information will be easier for people to access and use. We hope the interactive map we made not only provides a convenience to passengers, but also brings about the ideas of integration between different transportation companies and the connection of people to information. Transportation is not only about providing convenience for small communities, but also about connecting different places and people on a large scale. In this sense, we hope our map could increase the collaboration between transportation planners and riders, so that we can together build a more sustainable Vermont.

3) CONNECTING PEOPLE TO PEOPLE: ENCOURAGING PARTICIPATION IN THE WAY TO GO CHALLENGE

Background

Even with effective sustainable transportation options in place and easily accessible information about those options, people need to be motivated in order to commit to sustainable transportation. We focused on connecting with the people of Rutland County in order to motivate them to engage in the Way to Go Challenge. The Way to Go Challenge encourages Vermont commuters to adopt more sustainable transportation habits. Participants in the challenge pledge to avoid single occupancy vehicle (SOV) travel between May 12th and 16th 2014, instead using public transportation, carpooling, biking, walking, or telecommuting as their travel mode. Although the challenge itself lasts for just one week, the hope is that it increases general knowledge about the impacts of SOV travel, the benefits of sustainable transportation, and the fact that each commuter has a *choice* in planning their mode of transport. Traveling sustainably during the challenge week could act as a catalyst for more frequently choosing a sustainable travel option.

This was the 10th year of the week-long Way to Go Challenge in Vermont. Over the past eight years, participation numbers have increased from 1,175 in 2006 to 4,640 in 2010. Despite this general upward trend in participation, Rutland County participation has remained low. In 2012, only 101 participants from Rutland County registered for the Challenge; in 2013, that number dropped to 91 participants.⁵

We believe that Rutland County has far more potential than these numbers suggest. As the second most populous county in Vermont (behind Chittenden County), Rutland County houses several businesses that the entire state of Vermont relies upon—Green Mountain Power, Rutland Regional Medical Center, and GE Aviation. Rutland City hosts an array of businesses and schools ranging in size from small to large. With all these businesses, schools, and people, there are lots of commuters.

Our goal was to present the challenge in a way that speaks to the thousands of Rutland County commuters who have not yet been reached by Way to Go marketing. We believe that an effective community-based social marketing campaign could drastically improve Rutland County participation and thereby increase awareness about sustainable transportation options within Rutland County (McKenzie-Mohr 2011). To measure the success of our efforts and to work towards something more concrete, we set a goal: Ten new businesses or schools will register to participate in the Challenge and 182 people will participate, exactly double the number from 2013. As our results analysis shows, we reached our participation number goal and almost reached our new businesses goal. We hoped that we would be able to create a streamlined approach for recruiting businesses, schools, and individuals, and that this approach could be used in future years to ensure continued participation in the Way to Go Challenge.

Methods and Results

We used a four-step, community-based social marketing approach, adapted from the methodology suggested by McKenzie-Mohr (2011). First, we defined goals and selected the behaviors we wanted to promote. Second, we identified barriers and considered how these barriers could be addressed. Third, we developed and implemented strategies for overcoming barriers and promoting the desired strategies. Fourth, we evaluated our results and made recommendations for future Way to Go promotion campaigns.

⁵ See Appendix III for more Rutland County Way to Go statistics from 2012 and 2013.

Step 1: Set goals and select behaviors

In order to launch a successful campaign, we needed clearly defined goals. Our overarching goal was to double the number of participating individuals and have ten new businesses or schools register for the Way to Go Challenge. Though we broadly wanted to promote sustainable transportation behaviors, we recognized that these behaviors could take many form: walking, biking, carpooling, bussing, using public transportation, and telecommuting are all forms of sustainable transportation. The key to our campaign was identifying which form(s) of participation are most suitable for various businesses, schools, and individuals within Rutland County. Different modes of sustainable transportation suited different participating groups. For example, at the elementary school in Brandon, encouraging students to take the bus made sense, but at Green Mountain Power, carpooling was a better strategy. Throughout the research stage, we were able to identify more precisely which strategies were suitable for each target.

Step 2: Identify barriers

Barriers are actions that prevent people from engaging in a particular behavior. The low participation numbers within Rutland County suggest that a combination of barriers have prevented Rutland County commuters from engaging in the Way to Go Challenge. Although we immediately developed theories on why Rutland County participation might have been low—based on our previous knowledge of the region—we also recognized that these theories were nothing more than assumptions. As McKenzie-Mohr (2011) points out, building a marketing campaign based on unfounded speculations will not necessarily produce the desired results. For example, if we assumed that Way to Go participation numbers have been low in Rutland County because the public transit system does not effectively serve commuters, we might create an entire campaign around altering public transit routes in the county. If, however, the real barrier was that people have not heard of the Way to Go Challenge, all of our work altering transit routes would have been wasted, because people would still not know how to sign up.

Thus, accurately identifying the barriers in Rutland County became the second step of our community-based marketing campaign. In the context of the Way to Go Challenge, we were interested in determining what barriers prevent people from commuting sustainably on a day-to-day basis and which barriers prevent people from signing up for the Way to Go Challenge.

In order to determine these barriers, we launched a multi-faceted research campaign. Our research took five forms: online research about the Way to Go Challenge and Rutland County, interviews with Way to Go representatives across Vermont, interviews with past winners of the Challenge, observation of transportation habits in Rutland County, and interviews with Rutland County commuters and businesses.

1) Online Research

We performed online research about the Way to Go Challenge and Rutland County. By exploring the waytogovt.org website, reading articles about past years of the Challenge, and staying up-to-date with transportation issues in Vermont, we began to develop a sense of the kinds of barriers that may play a role in the low participation numbers in Rutland County. For example, perusing the “Promotion Kit” section of the website suggests that having a few key “champions” within each business could play a big role in participant recruitment; perhaps Rutland County lacked these figures. An opinion piece in the Rutland Herald titled “[Road] Crossings near school not safe” suggests that safety concerns could decrease the number of students walking to school within Rutland City (Sanborn, 2014).

2) *Way to Go Representatives*

We contacted important Way to Go representatives across Vermont.⁶ By talking to leaders like Suzanne Elowson, Director of the Way to Go Challenge, and Susan Schreibman, the point person for Way to Go in Rutland and Assistant Director of the Rutland Regional Planning Commission, we started to get a better sense of the types of barriers commonly encountered, both with the Challenge, and in Rutland. We also reached out to Bryan Davis, director of the Chittenden County Way to Go Challenge. Although Chittenden County has a different set of barriers than Rutland County, we felt it would be useful to talk with Bryan because Chittenden County has had very high participation numbers in past years. He primarily stressed that Chittenden County is successful in the Challenge because of a high level of enthusiasm. The challenge started off as a Chittenden County campaign 10 years ago and is now viewed as an old tradition that many residents in Chittenden County anticipate every year. Bryan suggested that a major barrier in Rutland County might be that people have not heard about the challenge because it is not as thoroughly embedded in Rutland County as it is in Chittenden County.

3) *Past Winners of Way to Go*

We contacted past winners of the Way to Go Challenge. The Way to Go Challenge breaks down its winners into categories: Macro Business, Large Business, Medium Business, Small Business, Elementary School, High School, and College/University. All but two of the winners in these categories were from Chittenden County. We recognized this trend immediately and decided to reach out to those winners to see how they were so successful. We were also looking specifically to see if Chittenden County and the businesses and schools in the county do other sorts of promotions that no other county does, and we found that they do not. Once again, previous familiarity with the challenge was emphasized as an important aspect of participation: most of the past winners said that they have been doing the challenge for years, which is why they continue to sign up. Since we already acknowledged that different strategies would be suitable for our Rutland County targets on a case-by-case basis, we wanted to hear how strategies differed for an elementary school compared to a macro business. This allowed us to develop ideas about how to approach different targets before selecting and contacting them. Past winners also recognized that Chittenden County is lucky to have great public transportation and safe places to bike and walk.

4) *Transportation Observations in Rutland County*

We visited Rutland County to observe transportation habits and systems. These visits gave us the opportunity to observe for ourselves the lack of sidewalks on roads near schools, the absence of Way to Go Challenge posters, and the spread-out nature of many Rutland County towns. While we were not able to extensively study the habits of travel in Rutland, we saw very few people walking or biking. We also learned from our colleagues, who were also taking an in-depth look into the use of public transportation, that while public transportation is heavily relied upon in Rutland County, barriers remain that prevent usage (Arno et al., 2014).⁷

⁶ See Appendix I for interview questions.

⁷ These barriers are described in detail in the following section.

5) Interviews with Rutland County Businesses and Commuters

We had in-depth conversations with representatives from Rutland County businesses and with individual commuters. In these conversations, we heard about the barriers that Rutland County commuters identified—barriers that they personally experienced on a day-to-day basis. This last step allowed us to narrow in on the most important barriers preventing Way to Go participation within Rutland County.⁸ Some of these barriers were simple and others were complex.

These five research approaches allowed us to develop a list of barriers that might be contributing to the historically low Way to Go participation rates in Rutland County. We had two broad categories of barriers: those preventing sustainable transportation and those preventing Way to Go sign-ups.

Category 1: Barriers preventing sustainable transportation

Out-of-town commuters

Because Rutland serves as an employment hub within Vermont, many employees who work in Rutland do not live in Rutland. Workers come from different towns and counties spread out all across the region, some commuting from neighboring states. Most of these commuters drive alone to Rutland. In small businesses, employees rarely work with others from their towns;⁹ in large businesses, people reported that schedule differences prohibit carpooling.

Barriers within the public transportation system

The public transportation system, while an important resource for many, has several insufficiencies that prevent widespread use (Arno et al. 2014). First, the website for The Bus, Rutland County's public transportation line, has limited functionality and lacks visual appeal. Finding routes and schedules on the website is very difficult. Second, the bus stops throughout Rutland County are insufficiently marked, have minimal information on bus routes, and do not provide appropriate cover in case of inclement weather. Third, The Bus does not service all townships. Even when bus lines do exist to other towns, they are often dismissed as a means of transportation; they are perceived as inconvenient or incompatible with work schedules (Anonymous Bus Rider, 2014). Thus, when there is limited public transportation, and workers live too far to bike or walk, people think that there are very few sustainable transportation options.

Junior Operator License regulations

After passing a driver's license test, Vermont regulations mandate that individuals under the age of 18 be issued a Junior Operator License (Department of Motor Vehicles, 2014). Under the terms of this license, the young driver cannot transport individuals outside of his/her family for six months after license acquisition. These restrictions limit student carpools at high school, because students cannot legally drive their peers. Consequently, many high school students end up commuting alone, even when they live near other high school students.

⁸ We had hoped to use our GIS analysis of commuter patterns as a further tool for identifying barriers, but due to timing restrictions, we were unable to do so. Now that the maps are complete, we hope that the RRPC will be able to use these maps in future years to help develop promotion strategies for the challenge.

⁹ The maps in Appendix IV illustrate these general trends.

Free blocks during school

Seniors at Rutland High School are granted free periods throughout the day, during which they are permitted to leave the school campus. These senior privileges further discourage carpooling, because students want the flexibility to leave school mid-day or head out early if their schedules allow. Were they to carpool, students feel as though this freedom would be limited by their friends' schedules.

Parents work schedules incompatible with school buses

At the elementary school, most children commute by school bus. However, parents who must be at work early in the morning often drive their children to school rather than leaving them to take the school bus. For these parents, driving their child to school allows the child to be under adult supervision at school (prior to the start of the school day); otherwise, they would wait at home unsupervised between their parents' departure and the arrival of the bus. Thus, even some students who are on bus routes cannot travel via bus due to logistical barriers.

Category 2: Barriers preventing Way to Go sign-ups

Not familiar with Way to Go Challenge

Unlike Chittenden County where the Way to Go Challenge has its roots, people and businesses in Rutland County did not know about the Way to Go Challenge. We identified this as a barrier on our very first day in Rutland. Not a single person we spoke to—even those within businesses that have promoted the challenge in the past—could have described the Challenge without our assistance. This was a clear barrier: if you don't know about the Challenge, you can't sign up.

Limited access to promotional materials

Although the Way To Go website provides a handy promotional kit with pre-made posters, not all businesses, schools, or individuals have access to printers. When we met with Jody Sabataso at Rutland High School, he was completely on board to promote the challenge within the school, but did not have the budget to print out posters or handouts at the school.

Limited follow-through with sign-ups

Even when people are interested in the Challenge, they still need to actually take the steps to sign up online. If computers are not available at the time of the promotion, mobile phones are an option, as you can sign up for the challenge with phones that have access to the Internet. If neither of these two options are accessible at the time a prospective participant wants to sign up, we will lose them purely because they forget to sign up. McKenzie-Mohr (2011) states that, "Numerous actions that promote sustainability are susceptible to the most human of traits: forgetting." The paper suggests that "prompts" are a way to combat forgetfulness, and we tried to get as many prompts out as we could, but, without a doubt, we missed some of the people we had been in contact with during our quest for increased participation.

Uncertainty about prizes

McKenzie-Mohr (2011) identifies incentives as an effective way to promote positive behaviors. One of the crucial aspects of implementing an incentive, however, is to make sure it is visible. An incentive cannot have an impact if people are not aware that it exists. We found that people we spoke to did not generally know about the prizes for participation in the Challenge.

Even if they had heard of the prizes, they often felt uncertainty about exactly how to acquire a prize. Common questions included: “Can I get a prize just by signing up?” “My business is really small. Can I still win prizes?” “Does the rate of participation within my business matter, or just the numbers?” Although the answers to these questions are available online, they are not obvious. This type of uncertainty can create just enough inertia to prevent someone from signing up.

Overcoming the outlined barriers

Category 1:

- *Out of town commuters:* connect commuters across businesses, encourage people to use Zimride/GoVermont sites, post carpool lists in small businesses/offices
- *Barriers within public transport system:* use GIS maps to determine useful routes
- *Junior Operating License regulations:* encourage kids to take bus during first 6 months, walk, bike, ride with older friends
- *Free blocks during school:* encourage carpooling during the challenge
- *Parent work schedules incompatible with school bus:* encourage carpools, biking, and walking

Category 2:

- *Not familiar with Way to Go Challenge:* Relay the challenge and past statistics for Rutland County, Spread the word, find champions who are enthusiastic about the challenge to spread the word even more, talk to businesses who might be willing to promote the challenge, follow up with human resources offices, attend staff meetings. Use Facebook posts, flyers, take-away pamphlets at counters, radio promotion, newspaper promotion, television promotion, talk at a Select Board meeting, and informational tabling at the Rutland City Coop
- *Limited access to promotional materials:* print posters for schools/businesses, come up with ways of promoting the challenge without printed materials (for example, TV announcements in schools, radio, etc.), contact Way to Go Director to see if there are materials for the challenge that can be acquired and brought to Rutland
- *Limited follow-through with sign-ups:* bring computers to conversations, meetings and presentations and have people sign up right then and there
- *Uncertainty about prizes:* We contacted Way to Go VT for clarification and asked that they be more explicit about the way the prizes are awarded and discussed the option of having participation be by rate not by number.

Step 3: Develop strategies

In order to develop strategies to promote the Way to Go Challenge, we relied upon our literature research, our experiences from trips to Rutland, and discussions with our community partners. Guided by these observations and conversations, we developed a two-pronged strategy that we believe can reach the greatest number of Rutland commuters.

Strategy Part I: Our Targets

When we met with Steve Schild, GIS Manager for the Rutland Regional Planning Commission, he suggested that we would have greater success promoting the challenge to targeted businesses and schools, rather than trying to target entire towns. We chose targets within

each category established by the Way to Go organizers: Macro Business, Large Business, Medium Business, Small Business, Elementary School, High School, and College/University. Prizes are awarded to a school/business in each of these categories that has the highest statewide participation numbers. Our target businesses were as follows:¹⁰

Macro Business: Rutland Regional Medical Center
Medium Business: Green Mountain Power
Small Business: Green Screen Printing
College: Green Mountain College
High School: Rutland High School
Elementary School: Neshobe Elementary School

Business and school target selection:

As a member of the Rutland community, Steve Schild had a good sense of what local businesses and schools might be receptive to the Way to Go Challenge. After meeting with him, we decided to reach out to the Rutland Regional Medical Center, Green Mountain Power, and Green Mountain College.

To determine the rest of our targets, we relied on research and our visits to Rutland. We found a report that listed all the elementary schools in Rutland County that participate in the Safe Routes to School program (Vermont Safe Routes to School, 2013) and chose one in Brandon because its proximity to Middlebury would allow us to make more frequent trips there, if necessary.

On our first visit to Rutland, we were “hunting” for a small business. We thought this was something that would be easier to choose in person when we could explore the town, ask Rutlanders for suggestions, and get a feel for the small businesses. In our meeting with employees from Green Mountain Power (GMP), they suggested that we target Green Screen Graphics as a small business; once we visited, we felt confident that they would be on board with the Way to Go Challenge because of their display of enthusiasm and environmentally conscious lifestyles. The GMP employees also suggested that we work with Rutland High School, as many students, faculty, and staff commute there every day.

Meeting with targets:

For the businesses we knew we were going to target, we sent an email letting that business know we were going to be making a trip to Rutland and asking if we could meet with them. We went into the meetings and explained our project and goal and asked if the challenge was something they would be interested in participating in. The businesses we met with were all enthusiastic about participating. We collaborated with them to figure out what sort of strategy would work for their business/school in particular. For the elementary school, we found that having college kids come in and talk to the students, along with sending home a letter to the parents, would be a winning strategy, which is different than how we would approach our high school target. We created a strategy with our point person in each business and school that was tailored to fit each of their needs and audience.

During our first visit to Rutland, it became clear that there were many people who already traveled sustainably, or who would be willing to participate in the challenge if they only knew

¹⁰ We had hoped to work with General Electric as our “Large Business,” but were unable to connect with them.

about it. We knew that we would not have the time to help all of these people and other businesses strategize, but we did not want to miss the opportunity to spread the word about the challenge. This led us to the second part of our strategy.

Specific Approaches for Specific Targets:

Preface

Before we were able to formulate a strategy for each target, we had to familiarize ourselves them individually. We first confirmed that our contact person from each target thought that the Way to Go Challenge would be well received within their business or school. From there, we moved forward and usually spoke with the contact person first to get the history of, and general background about, the company. After this initial conversation, we went into each business to talk with more employees, observe habits, and identify any barriers that we had not accounted for. From these conversations and observations, we made a “plan of attack” for each target.

Rutland Regional Medical Center

We communicated with the Patricia Baird, of the Human Resources Office, Sarah Narcewitz, Program Director of Bowse Health Trust, and Laura Medlin, RRMCC Wellness Coordinator. They helped to publicize the challenge within the RRMCC. Laura added the challenge to the incentivized Wellness Activity List; if employees participate in list-approved activities, they win points that can go toward rewards. Sarah and Patricia distributed posters throughout the RRMCC. Although we offered to attend a staff meeting or table at the hospital doors, those options were not accessible to us during the weeks preceding the challenge.

Green Mountain Power

Green Mountain Power is a business that had participated in the Way to Go Challenge in previous years. The business is quite separated not only by two different locations in Rutland City, but also mindsets. We met with one of the roughly 25 employees at the GMP Innovation Center. The other location hosts hundreds of employees and is not right in the city center. The employee we spoke with noted these differences immediately. He told us that most of the employees who work in the Innovation Center are already environmentally conscious. However, even though an email about the Way to Go Challenge went out to all employees last year, very few employees signed up for the challenge. We did originally think that we would target the whole company, but realized that not many of the environmentally conscious employees in the Innovation Center participated in the challenge. An interview with Sarah Simonds, Energy Program Manager at Vital Communities, awakened us to the idea of creating a “micro-culture” within an office where Way to Go participation was the norm (Simonds, 2014). Since we did not want to spread our efforts too thinly, we decided that our efforts would yield a higher percentage of participation if we just focused on creating a “micro-culture” in favor of Way to Go at the Innovation Center, where the environmental consciousness of the employees made them more likely to jump on board with the challenge.

Many of the employees at the Innovation Center already bike to work and drive electric cars. For the biking and walking group, we had to tell them about the challenge and why it is important for them to sign up and spread the word. For people driving in electric cars, we encouraged them to open up the car and allow fellow employees to ride with them. To facilitate this, we set up sign-up sheets in the office for each employee to write where they are coming from each day. For the employees who do not bike, walk, or drive an electric car, we directed

them towards the car pool lists that had been set up, encouraged them to use GoVermont if there was not a feasible car share available in the office, take public transportation if available, and we asked them if they would bike or walk to work. We also tried to get into a staff meeting at GMP to ensure that everybody in the office knew about the challenge, but again, scheduling prevented us from doing so.

Neshobe Elementary School

In our first meeting with Principal Judi Pulsifer, we talked about the ways we could pair the Way to Go Challenge with their health and wellness teachings to the students. Specifically, she wanted to make sure that the students would learn about the health benefits of biking and walking to school. We agreed that was something we could focus on. Every year, Neshobe Elementary has a “Walk to School Week,” and we discussed coordinating that week with the weeklong Way to Go Challenge. We first talked about the safety of this because we had noticed that the winding road leading to school has only a few areas that have sidewalks. Judi explained that many of the students will gather a block from school and walk up to school together, instead of doing the entire walk, which is not safe because of the lack of sidewalks and winding roads, as described above.

Taking the safety issues into consideration, we did not want to use biking and walking as suggestions for the students as modes of non-SOV travel during the challenge. Also, we needed to keep in mind that these are elementary students, grades K-5, and do not have that much of a say on their mode of transportation.

We found out that majority of the students take the bus to school every day. This was good news because each bus rider is already traveling sustainably. We realized that we had to let the kids know that what they are doing is good and why it is good. With this information, we hoped that they would be inspired to keep up these sorts of habits as they grow older. We understand that the students will not be able to sign up for the challenge themselves, which is why it was imperative that we involved the parents and sent them a letter (which Judi suggested be short and bulleted). Part of this letter briefly explained the challenge and then addressed two categories: 1) students who take the bus and 2) students whose parents drive them to school. For the parents whose child takes the bus, we also briefly explained to them why this is a good choice. Then, we encouraged them to sit down with their child to sign him/her up, and also encouraged them to sign up too!

For the parents who drive their child to school, we shared with them the environmental benefits of switching to non-SOV travel and how important setting an example for their child is. The main approach we would suggest to them is carpooling. Judi told us she would not be able to give us any contact information to assist in setting up carpools, and the sign up sheets we used for GMP would not work here. But, since Brandon is such a small town, we thought that many of the parents would know where some other students live, preferably on their own street. In the letter, we encouraged the parents to reach out to other parents and get a carpool set up. In this way, both the students and the parents are participating.

Green Screen Printing

Green Screen Printing was our Small Business target. We found that we were unable to identify a Small Business until we actually became familiar with Rutland and visited some of the small businesses that are in downtown Rutland. This was mainly because the businesses are so small that they do not have a large presence on the Internet, and also because we wanted to note if there was a certain type of character who worked at each business.

We learned that some employees already use modes of sustainable transportation to commute to work, thus only needed to be informed about the challenge so that they could sign up. We met with the owner of the company, Mike, to talk about promoting the challenge within the company.

Mike told us that he holds a staff meeting every day and would be more than happy to tell his employees about the challenge. This was a good step, but we still did not feel like that would be a big enough push to encourage somebody to sign up. In our little blurb about the challenge, when we had mentioned that there were prizes to Mike, his facial expression changed. We decided to go back to that to try to find something that would really pump him up, which in turn would, hopefully, be a contagious energy to his employees. We told Mike what the great prizes were and he became very excited. He told us that his employees would love to hear that and that knowing the prizes would surely get some of his employees to sign up for the challenge. Although a much different approach than the other businesses and schools, the incentives were the selling point for Green Screen Printing, which McKenzie-Mohr writes is one way to “enhance motivation to act.”

Rutland High School

After suggestions from several people, we decided to reach out to Rutland High School and met with AP Environmental Science teacher, Jody Sabataso. When we met with Jody, we were able to list off the different things that we had set up with other businesses and schools to facilitate their participation in the Way to Go Challenge, but none of these methods seemed suitable for high school students.

Jody told us about his AP Environmental Science class and how they would be excited to hear about this challenge. We asked him if they would like to play a larger role in the challenge. We proposed to Jody that his AP Environmental Science class take the lead on promoting the challenge at the high school. At the elementary school, Judi stresses that it would be important for the students to hear the message coming from college students. We did not think that the high school students would look up to college students in the same way, and thought that hearing about the challenge from a peer would be more effective.

Jody thought that was a great idea and told us he was looking for something for the kids to work on after they took their final exams and promoting the challenge within the high school would be perfect. We also thought that it would be important for the students in the AP Environmental class to feel like they played a part in not only getting some peers to sign up, but also increasing participation in Rutland County.

Green Mountain College

We chose Green Mountain College as our College category mainly because it is well known for its environmental efforts. We reached out to the Sustainability Coordinator, Aaron Witham, and told him about our efforts and asked if this sounded like something GMC would like to participate in. We received a very heartfelt email back saying how much they would like to, but that there were too many things in the way preventing it (lack of manpower at that time,

faculty grading finals, students gone, another environmental event going on at the same time). These were all things that we could not change though and we felt a bit “stuck” because we had no solutions at the time. We waited to begin work with GMC until after we had a list of strategies, mostly ones we used at other businesses, so we could approach them with many examples and brainstorm ways to overcome their barriers.

When we met with Aaron, we provided suggestions and examples of what we were doing in every other place. We did not leave it up to him to tell us what might work, but instead asked if we could get into a faculty or staff meeting. Aaron said that getting into a staff meeting would be able to happen, but seriously doubted that we could get into the last faculty meeting of the year. We told Aaron that we would really stress during this meeting the importance of GoVermont in the Way to Go Challenge (i.e. setting up rideshares), which would also help his efforts to get 100+ faculty and staff members to sign up for GoVermont.

We received an email a day later from Aaron with the good news that we had secured a slot in both the Staff meeting and Faculty meeting. We had five minutes in both of these meetings to inspire faculty and staff at GMC to sign up for the Way to Go Challenge.

Strategy Part II: Spread the Word

General Promotion to Businesses of Potential

Everywhere we went, we asked Rutlanders for ideas about businesses that might be open to participation in the Way to Go Challenge. We added these recommendations to a master list of businesses with high potential for participation. We went to each of the businesses on the master list we created and told them about our project and the challenge. Most people had not heard of the challenge and immediately agreed to participate once they heard about it. While we did not have time to make a “plan of attack” with them, we did follow up with all of them via email to remind them and so that they could easily access the link to sign up. The Way to Go Challenge already has a follow-up plan in place in which they contact all previous participants to let them know when the challenge is approaching.

PEG TV Advertisement

PEG TV is the local TV station in Rutland County. We heard that many people gather information about local events from watching his station, so we decided that it would be beneficial to promote the challenge through a PEG TV advertisement. We organized studio time and created a 15 minute piece to educate Rutlanders about the Challenge. Kimberly Griffin, Director of the Rutland Area Physical Activity Coalition, acted as our host. Kimberly interviewed Susan Schreiber, Assistant Director of the RRPC, and Julia Andrews, a marketing agent for Way to Go. She also interviewed Bry Kleber and Carey Favaloro so that we could present strategies on promoting the challenge. The full video can be found online at: <http://vp.telvue.com/preview?id=T00969&video=195310>

Banner Over Street

Susan told us that in past years, a Way to Go banner has hung between the buildings over the main street in Rutland City center. We contacted Green Screen Graphics and asked them to update the banner with information on this year’s Challenge. The banner hung over the street in the week preceding the Challenge, advertising the event to any passers-by.

Tabling at Rutland Natural Foods Coop

Based on suggestions from Rutlanders, we thought that the Natural Foods Coop might be a good place to recruit Way to Go participants. We spent an afternoon tabling at the Coop, and left information flyers on the Way to Go Challenge in the Coop after we departed.

Chamber of Commerce Newsletter

The Chamber of Commerce releases a monthly newsletter to update all the businesses of Rutland County on relevant information. After speaking with a Chamber of Commerce organizer, we provided a short, informational promotion on the Challenge to be included in the May newsletter.

Facebook Promotions

We reached out to several Facebook groups in the Rutland Area and asked them to promote the Challenge for us. The Rutland Area Physical Activity Coalition, Rutland Young Professionals, and Urban Mayhem all informed their readership about the approaching Challenge.

Step 4: Evaluation of Results

Results of the Way to Go Challenge

Our goal was to double the number of individual participants from the 2013 Challenge and to recruit ten new schools or businesses within Rutland County. We achieved the first part of our goal: 189 individuals in Rutland County participated in this year's challenge, as compared to only 91 participants in 2013. We did not achieve our second goal, but we came close: only eight new businesses/schools participated in the 2014 Way to Go Challenge.

Table 1. Rutland County Way to Go participation, 2014. Results compiled from waytogovt.org. Italicized entries indicate businesses/schools with whom we spoke; starred entries indicate businesses/schools that we worked with extensively as targets.

Business/School	Number of Participants
<i>*Rutland High School</i>	112
<i>*Green Mountain Power</i>	29
<i>*Green Mountain College</i>	21
<i>*Rutland Regional Medical Center</i>	10
Rutland Mental Health Services	6
<i>Rutland Regional Planning Commission</i>	3
Vermont Department of Health- Rutland	3
<i>Same Sun Choice</i>	1
<i>The Bike Center</i>	1
<i>Small Dog Electronics</i>	1
General Electric- Aviation	1
<i>Rutland Recreation and Parks</i>	1
TOTAL	189

As shown by Table 1, there can be little doubt that our promotion strategies influenced participation numbers in the 2014 Way to Go Challenge. We promoted the challenge at nine of

the twelve participating businesses/schools in Rutland County. We worked extensively with the four businesses/schools that had the highest participation numbers. Overall, we are encouraged by the outcomes of this year's Way to Go Challenge.

Further Barriers

Despite the general success of the Challenge, we dealt with a few unforeseeable barriers in the later stages of our work that impacted our promotion abilities and, likely, the participation numbers.

Neshobe Elementary School

We had a great initial meeting with the Principal and Guidance Counselor at Neshobe Elementary School and were excited to talk with the students and send letters about the Way to Go Challenge home with the students for their parents. This would have been an opportunity to educate children and adults, which was not something that we were doing with any of our other targets.

Unfortunately, this effort was impossible because the Principal did not return any of our phone calls after our first meeting. A week before the Challenge started, we received a call from the Principal apologizing for the lack of communication. By this point, it was too late to implement our strategy with the plan. We attempted to send a letter to the parents, but were unable to get in touch with the Principal again.

Green Mountain College

We were able to get on the schedule at both a faculty and staff meeting at Green Mountain College. The faculty and staff at the meetings seemed receptive to our presentation and asked many important questions. We planned to have laptops ready for faculty and staff members to sign after the meetings, but the meetings unexpectedly were in session for many more hours than we anticipated and we were not able to stay until the end of the meetings. We do believe that our participation numbers would have been higher had we been able stay until the end of the meetings to ensure that people would sign up for the Challenge.

Recommendations for Future Years

Putting the leadership within the targets

Our most successful target was Rutland High School. This was the only target that we completely delegated the promotional work that had to be done. After our meeting with Jody, in which we brainstormed strategies that could be used by his students, we did not do any direct promotion of the Challenge. We provided support as necessary by printing posters and answering questions from Jody, but we never interacted with the students themselves. We found that putting the leadership in the hands of the students yielded the highest results. This suggests that a message delivered from within a community is much more effective than a message delivered from outside a community. In future years, more focus should be put into identifying champions who can promote from within a business. Although we tried to do this, it was often difficult to find a champion willing to take on all the necessary work, and consequently we ended up doing much of the promotional work.

Ensuring sign-ups

When we first went business to business, we did not go around with our laptops. Instead, we just used those meetings as opportunities to tell them about the Challenge. In the final results of the Way to Go Challenge, we noticed that a few of the businesses we had gone to did not sign up. If we had gone to these businesses with our laptops so that they could sign up right then, there would have been more participants and new businesses in the final results for Rutland County. In future years, promoters should try to get potential participants to sign up immediately, rather than trusting that they will remember to do it.

Reach out to more specific businesses

Although we devoted time to general promotion of the Challenge, only three businesses that we did not explicitly meet with signed up for the Challenge. This suggests that we had a greater chance of recruiting participants when we made direct contact with the businesses, rather than relying on the banner or the TV ad as a way of increasing participation. The more time spent on the ground talking with businesses, the better!

Use the maps

Although we had originally intended to use the commutershed, walkability, and transportation network maps created by our classmates, time restrictions made this impossible. In future years, however, these maps should be incorporated into the promotional strategies for the challenge. The walkability map could be used to identify areas of high potential for walking/biking, the commutershed maps could be used to identify areas with high potential for carpooling, and the statewide transit map could be shared with participants who feel unnecessarily constrained by the existing transportation systems in Vermont.

CONCLUSIONS

Throughout this project, we had the chance to explore sustainable transportation in Rutland County and Vermont. We learned about the different sustainable transportation options available for Vermonters, became familiar with Rutland County, and educated ourselves about the factors that affect whether someone chooses to travel sustainably. We have worked to connect the regional planners to information on how to better understand and serve their riders by mapping and analyzing commutersheds. We have connected riders to information provided by the planners to better understand how they can travel sustainably in Vermont by producing a comprehensive, interactive map for the entire state. Finally, we have connected with many people in Rutland County to inspire them to take the plunge and commit to sustainable transportation as part of the Way to Go Challenge. We hope that we have been able to create a positive impact through our work, and that people in the future and in other regions may be able to use what we've done as a framework for further improving the transportation system and encouraging people to travel sustainably.

One of the biggest challenges in building a more sustainable transportation system is that the planning committees often do not have sufficient understanding of what the riders need while the riders oftentimes lack the access to the available resources provided by the transportation planners. Our work with GIS aims at helping the Rutland communities to build a more efficient transportation system and reconnecting regional planners, riders and resources.

While the GIS project is a way of making transportation information accessible, it only matters if people decide to utilize that information. Our goal was to help Vermonters realize that they can commute sustainably on a day-to-day basis. The Way to Go Challenge served as a great way for us to deliver our message. Through our work, we increased the participation of Rutlanders in the Way to Go Challenge and more importantly increased the awareness of sustainable transportation and lifestyle. The Challenge is only a weeklong event, but our hope is that it awakens participants to the idea that sustainable transportation is a choice that can be incorporated into the Vermont lifestyle, especially in Rutland County.

Sustainable transportation is critical to good development. It means allowing equitable access to the resources that everyone needs, improving the flow of ideas and creations, and promoting friendly interactions between people and the environment. In order to achieve these goals, the transportation system itself needs to be easily accessible to people and responsible for people's needs. The commutershed maps and the statewide maps we made help the planners to better understand the transportation system and build a more convenient system for everyone in Rutland. The statewide map and the Way To Go Challenge help riders become more engaged in—and supportive of—the sustainable transportation system the planners are building. All together, we hope our work addresses the importance of a sustainable public transportation system and supports the idea of sustainable development in Rutland in the near future.

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APPENDIX I: SURVEY QUESTIONS

A) Interview Questions for initial Way to Go surveys:

- 1) What was your role as the director for _____ county? (Essentially, were you hands on or just a liaison?)
- 2) What do people think of Way to Go VT?
- 3) Do lots of people know about WTGVT? How do they find out about it?
- 4) Was there any county-wide endorsement for the program? What was it?
- 5) What organizations in your county have the highest levels of participation?
 - a) Contacts for those places?
 - b) Why so successful? (this info we will likely get from those organizations)
- 6) What organizations in your county have the lowest levels of participation?
 - a) contacts for those places?
 - b) why so unsuccessful?
- 7) Are you satisfied with the levels of participation in your county?
- 8) How do you think you could reach more people?
- 9) Who can I get more information from?

B) Commutership Survey Questions:

- 1) What town do you live in?
- 2) What town do you work in?
- 3) How far do you live/work from the nearest town center?
- 4) Do you use public transportation to commute? Why or why not?
- 5) If you do not use public transportation, what would have to be done to encourage you to do so?
- 6) Are you familiar with:
 - The Bus, The Bus's stops, and its schedule
 - Nearby Park and Ride locations
 - Neighbors or friends with similar commuting destinations with whom you could carpool
 - Rideshare boards
 - VTRAN's Vanshare program
- 7) Are you interested in using any of these options?
- 8) How would you prefer to be informed of such transportation options?

APPENDIX II: PROCESSING METHODS

Commutershed Processing Steps

1) Copy over the VTcommutership folder to your computer's C Drive

For each Township:

2) Copy the Working Folder and paste into a new folder named Townname_Township (this prevents the original files from being changed or edited accidentally)

3) Create a new map called Townname_maps in the Townname_township folder, and make this folder the home folder. Make sure to save all DBFs and shapefiles to this folder.

4) For the Townname_CommuteFrom map:

5) Open GWGHNWNH.dbf, (named to remind users of the order of geocodes: Geocode:Work, then Geocode:Home, then Name of the town where the subject Works, and finally the Name of the subject's Hometown) select by attribute: "town_1"='[the town of interest]' then export to a new DBF, name it comfromabv.dbf (which stands for commuters from a three letter abbreviation of the town name). Repeat this process for the Townname_CommuteTo map:

From GWGHNWNH.dbf, select by attribute: "town"='[the town of interest]' then export to a new DBF, name it comtoabv.dbf (which stands for commuters to a three letter abbreviation of the town name).

6) Open both comtfromabv.dbf and comtoabv.dbf and summarize the first by the w_geocode attribute and the second by the h_geocode attribute, then save as comtfromabvs.dbf and comtoabvs.dbf, respectively.

7) Select Townname_CommuteFrom, and Join comfromabvs.dbf by the w_geocode attribute.

8) To complete the Townname_CommuteTo map, Join comtoabvs.dbf by the h_geocode attribute.

9) To generate a map, enter Symbology, and change the display to quantity based on the count field. Create a map in a new dataframe, turning on the ESites building classification dataset, the Tabblock township borders dataset, and the E911 roads layers in the layout view, and export to a PDF. Save all PDFs for this town under: Archives>Townname_Completed_Maps.

10) To make the magnitude of the commuter vectors more easily understood, each map produced in this way should be accompanied by a table highlighting the top 10 origins or destinations.

Alternatively, we have also produced and included a model that will automatically complete the data processing steps described above. The model can be found in the Geodatabase folder included with the preprocessed files in the "Original Trial" folder. To use this model for a new Vermont town, simply edit the model to include the desired town name in the two select by attribute functions, and then run it to produce layers for the distribution of commuter patterns to and from the town of interest.

APPENDIX III: 2013 WAY TO GO STATISTICS



Way to Go! Commuter Challenge

May 13 – 17, 2013

Outreach and Promotion

In the Rutland Region, successful contacts were made with Rutland Regional Medical Center, Rutland Mental Health, and Community Care Network, Green Mountain College, Castleton State College, Safe Routes to School contacts and School Superintendents. VT Country Store agreed to display promotional material/posters in-house. Mayor Louras of the City of Rutland allowed inserts of Way to Go flyers in pay stubs for City employees. Promotional efforts also included posting information on the RRPC Facebook page.

RRPC worked with Marble Valley Regional Transit District on an ad in the Rutland Herald on Monday May 13. The Bus reported that 10 cent fares Monday through Thursday generated a donation of \$747 to Community Cupboard.

RRPC's Way to Go banner hung across Center Street in downtown Rutland for the week prior to and week of Way to Go week.



Rutland Regional Planning Commission

Impact

- Residents from 17 of the Region's 27 towns participated.
- 91 Rutland Region residents.
- Average commute: 19 miles roundtrip.
- 1,722 miles of driving avoided.
- 6,142 pounds of hazardous pollution prevented.
- Carpool /Vanpool was the preferred commuting mode (27%), followed by biking (26%), walking (18%), transit (8%), and telecommuting (8%). 2 registrants traveled by renewable car.

Top Participants

- Top Towns: Rutland City (37), Brandon (11), Clarendon (8) and Rutland Town (5).
- Employers: 13 employers and 43 employee participants – RRMC (10), Visual Learning and GE (6 each) and CCV (4).

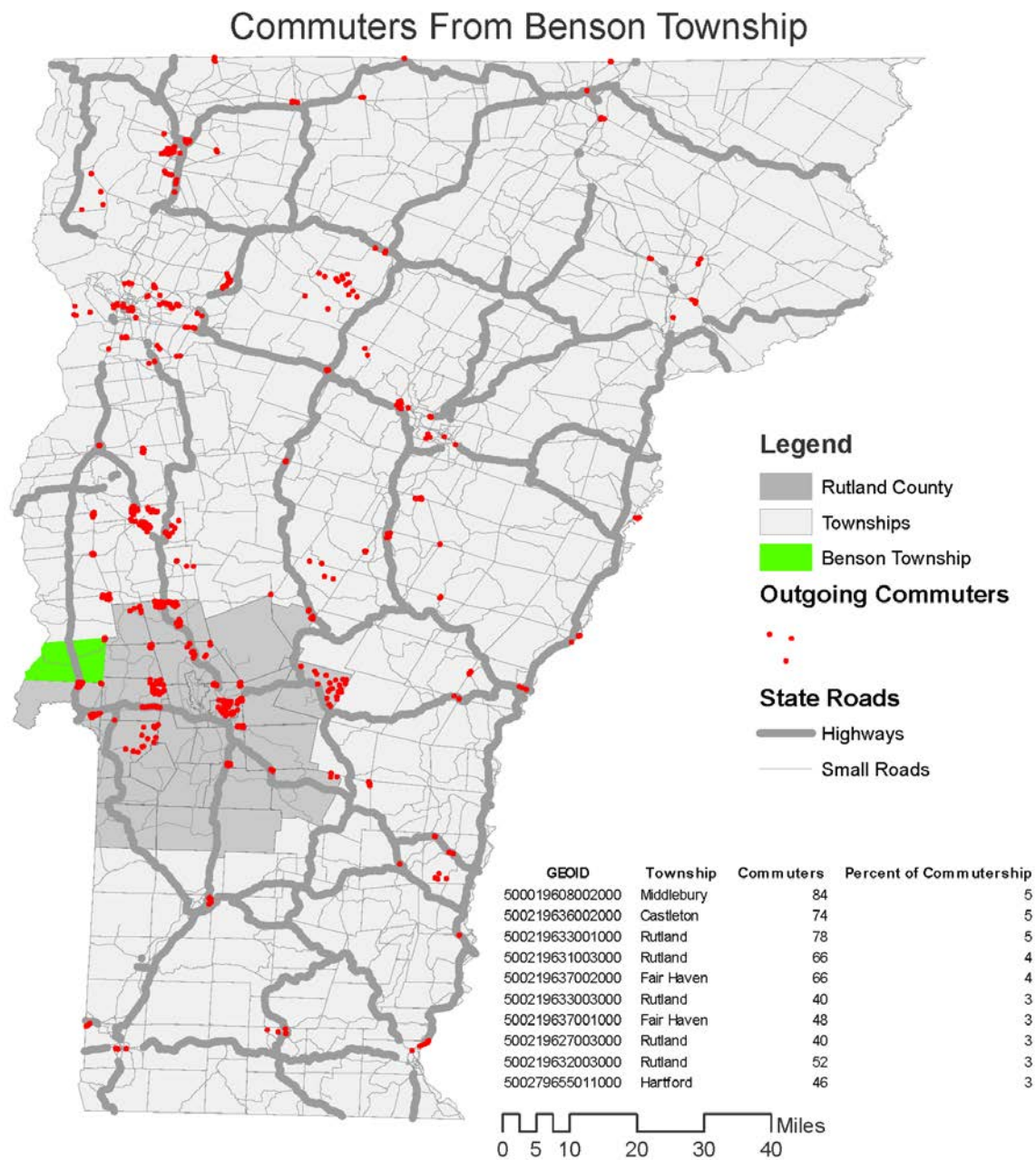


**Marble Valley
Regional Transit
District**

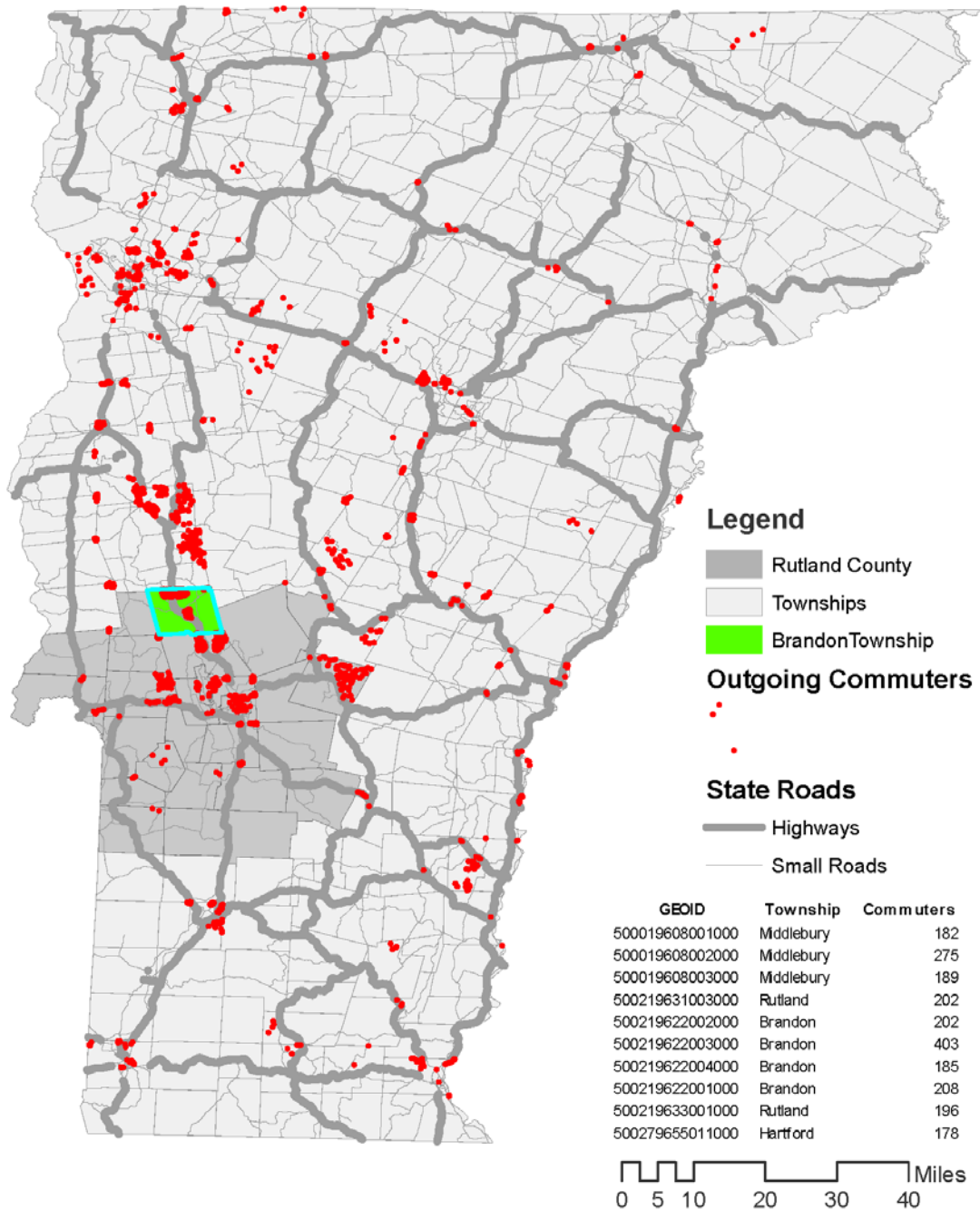


Banner over Center Street
in downtown Rutland (2011)

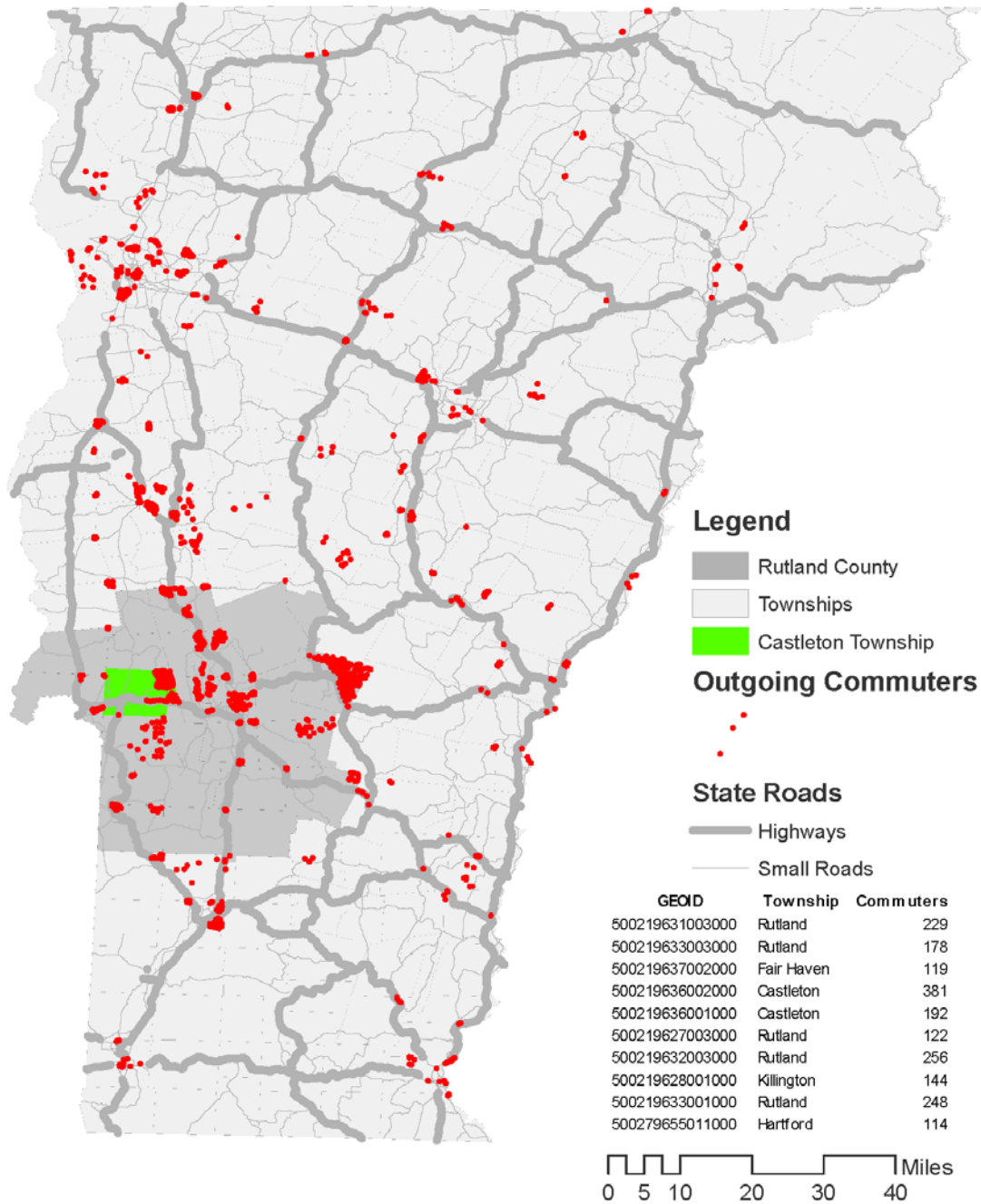
APPENDIX IV: COMMUTERSHED MAPS



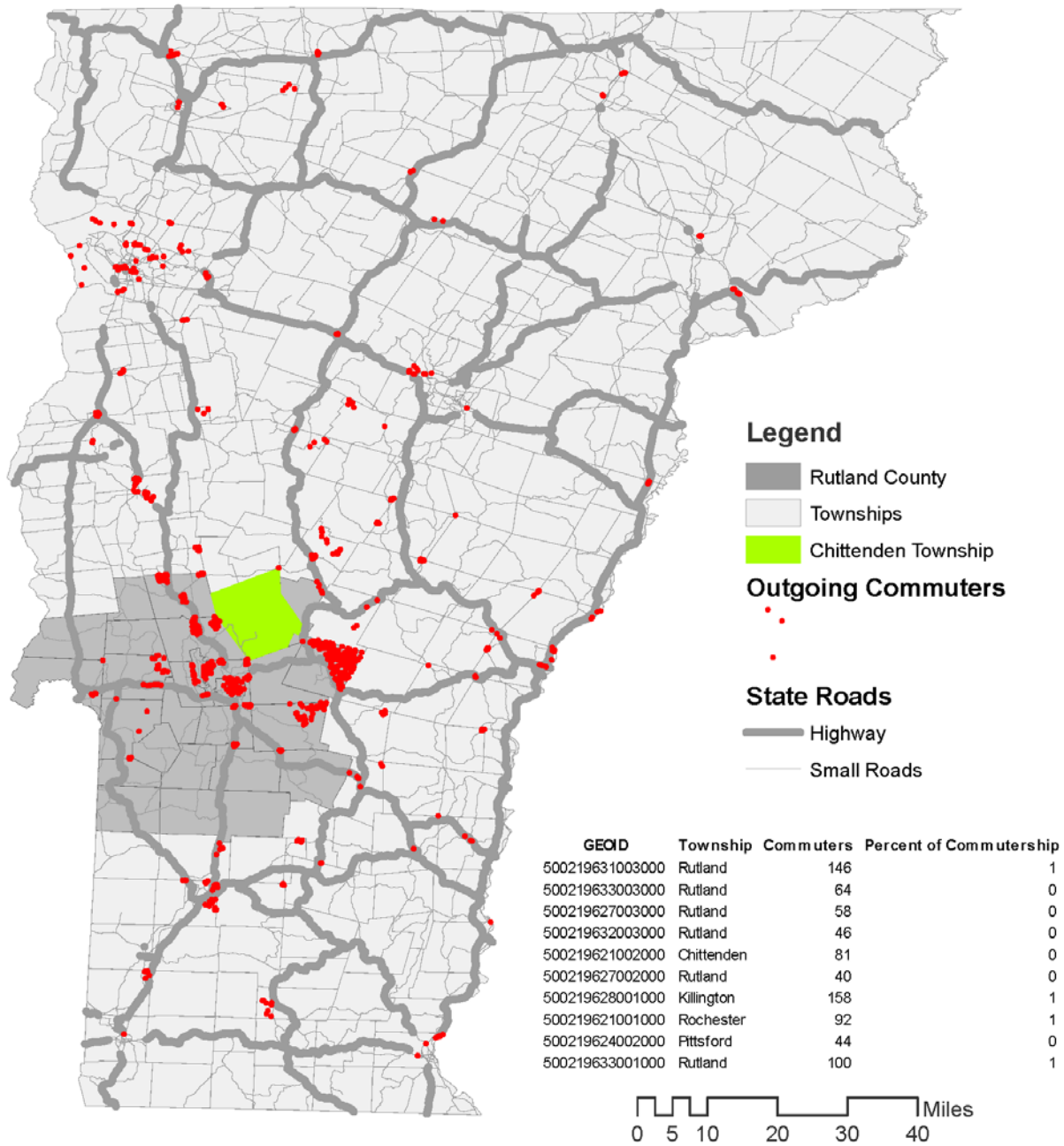
Commuters From Brandon Township



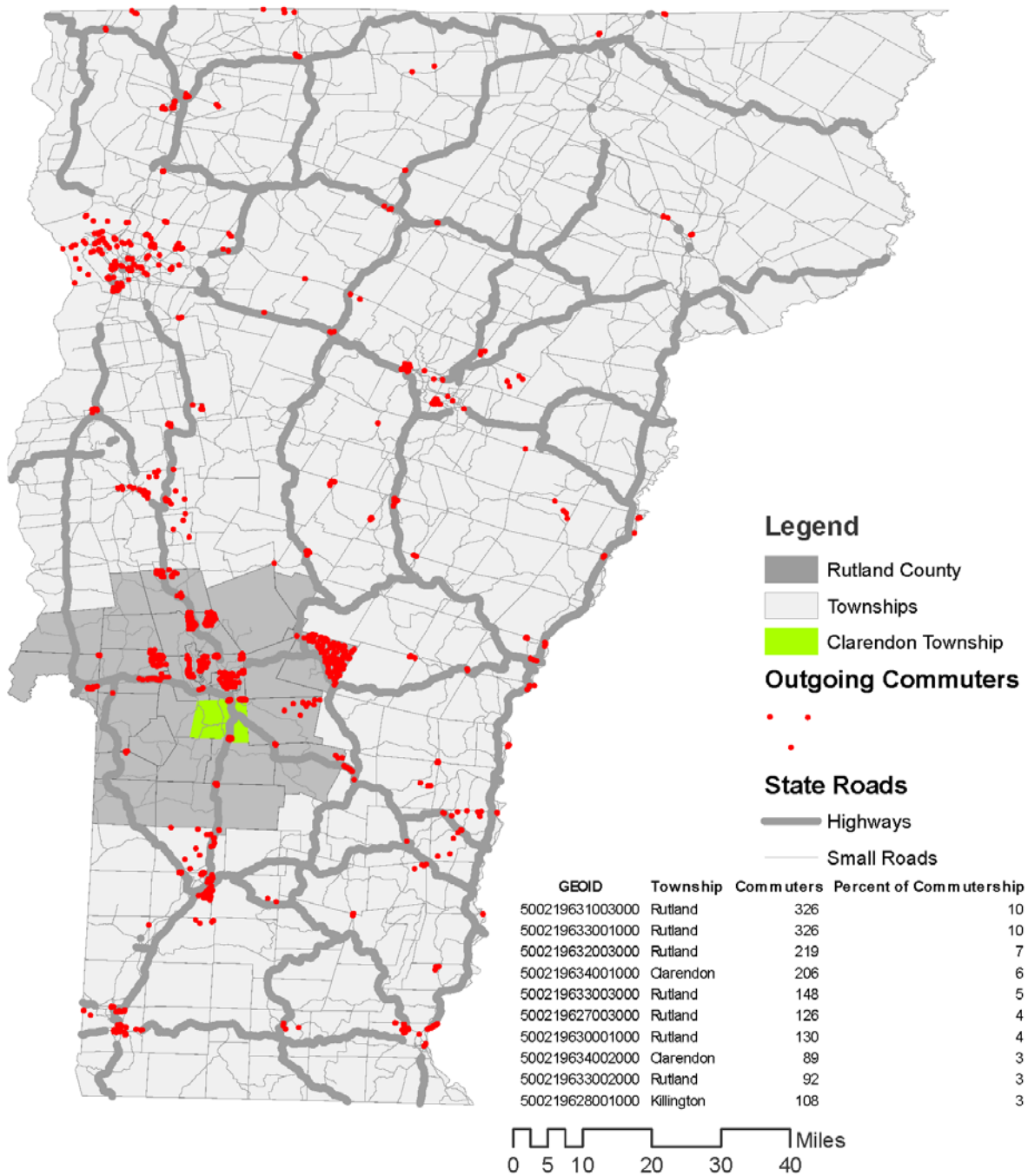
Commuters From Castleton Township



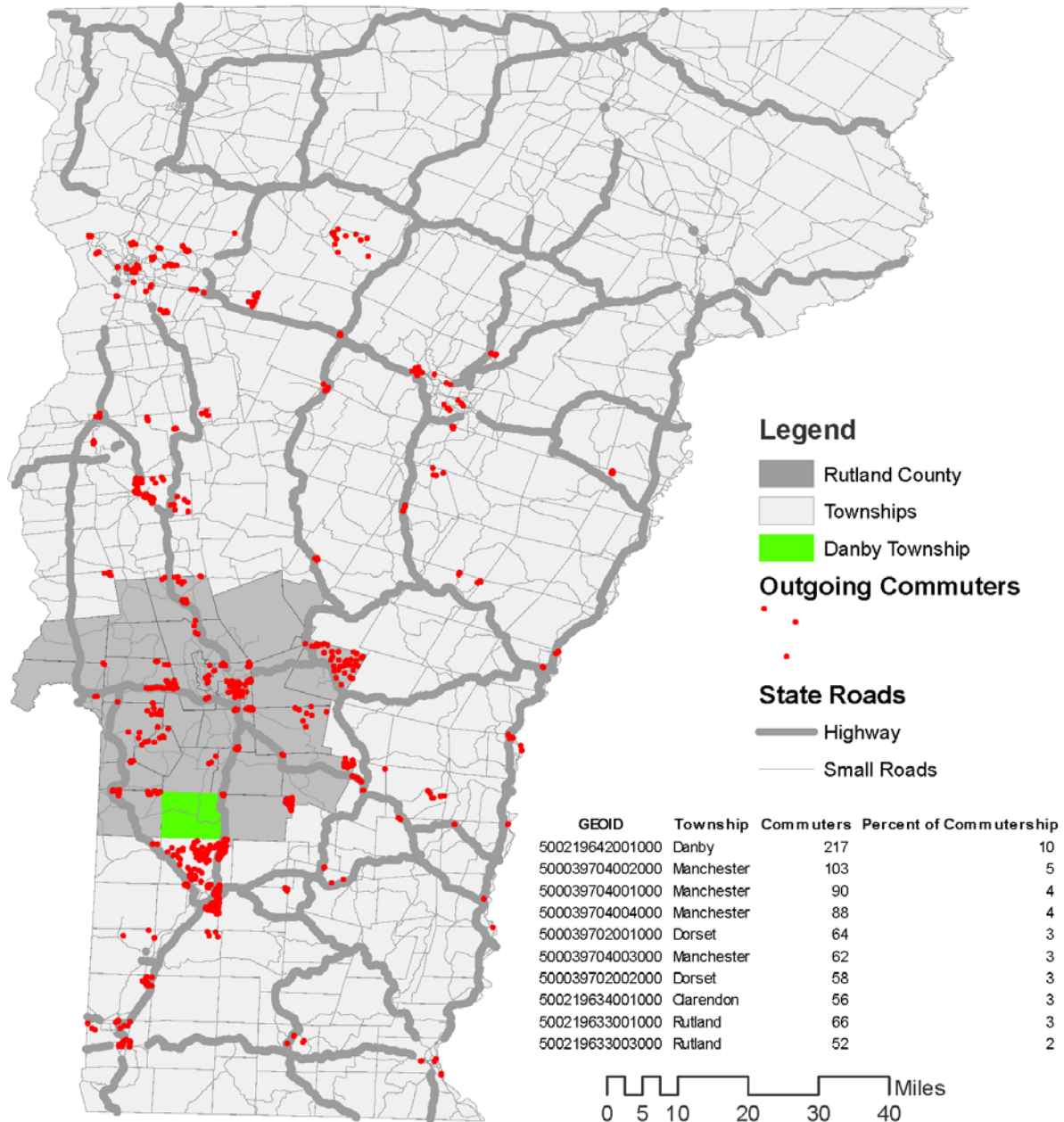
Commuters From Chittenden Township



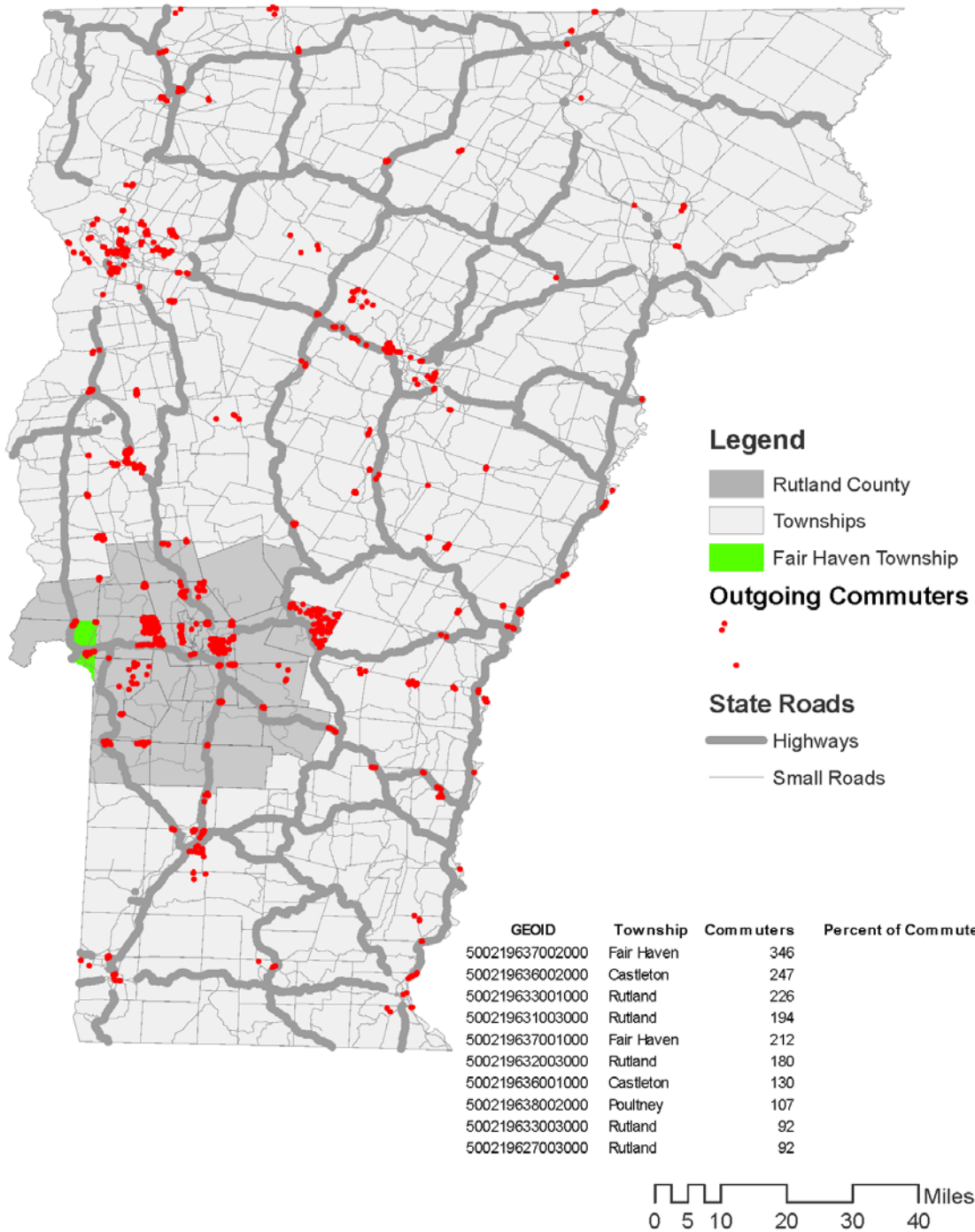
Commuters From Clarendon Township



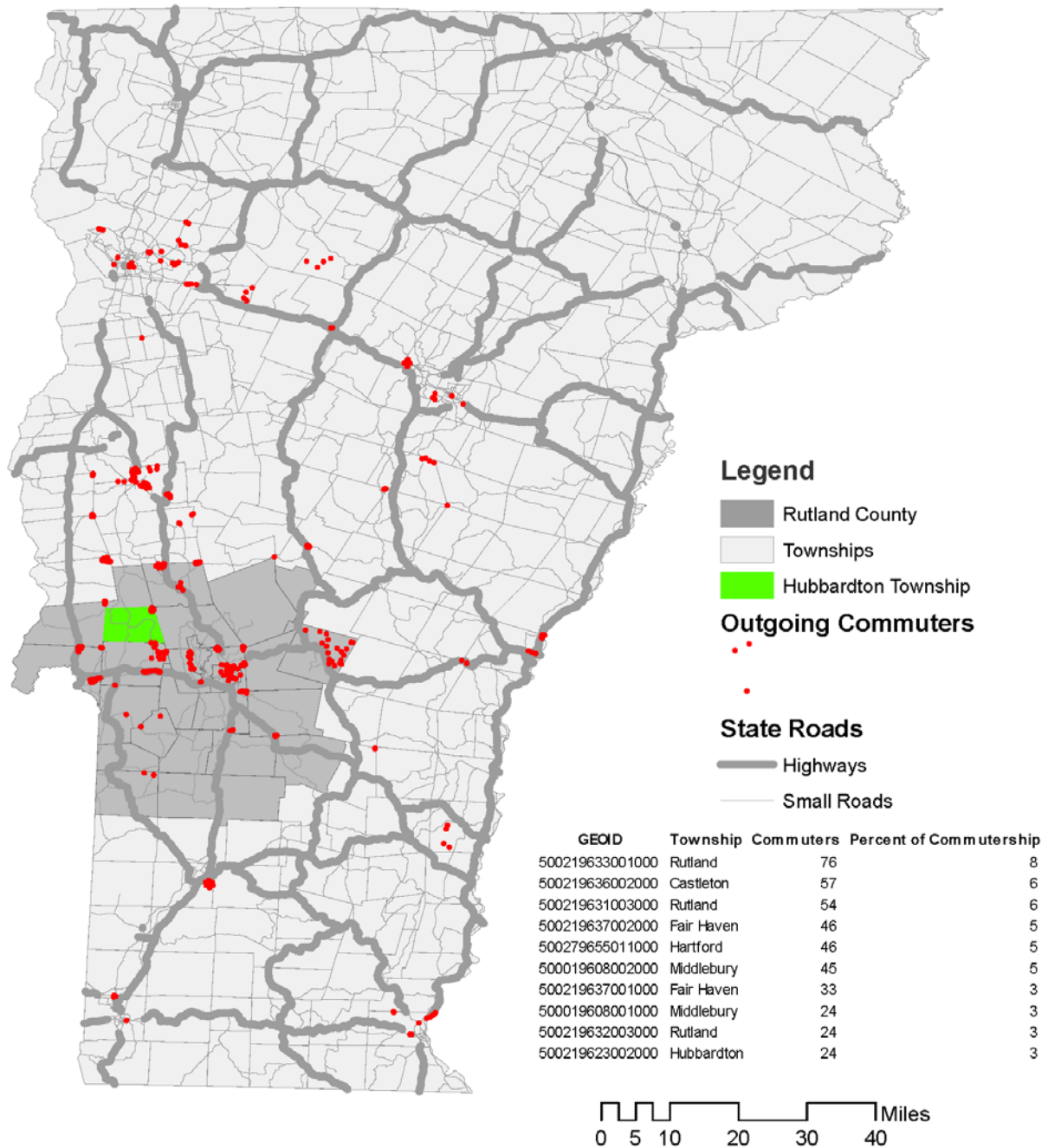
Commuters From Danby Township



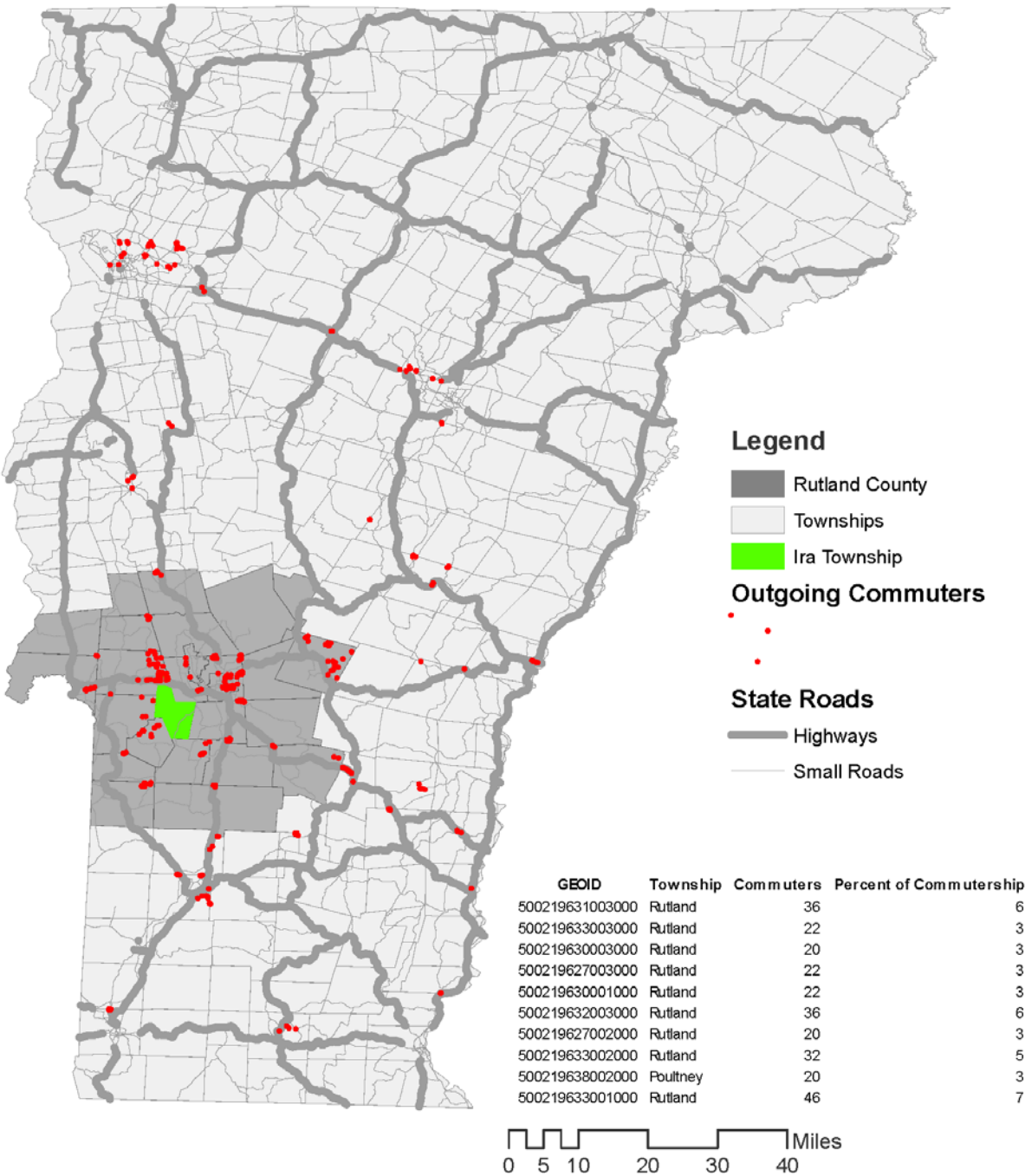
Commuters From Fair haven Township



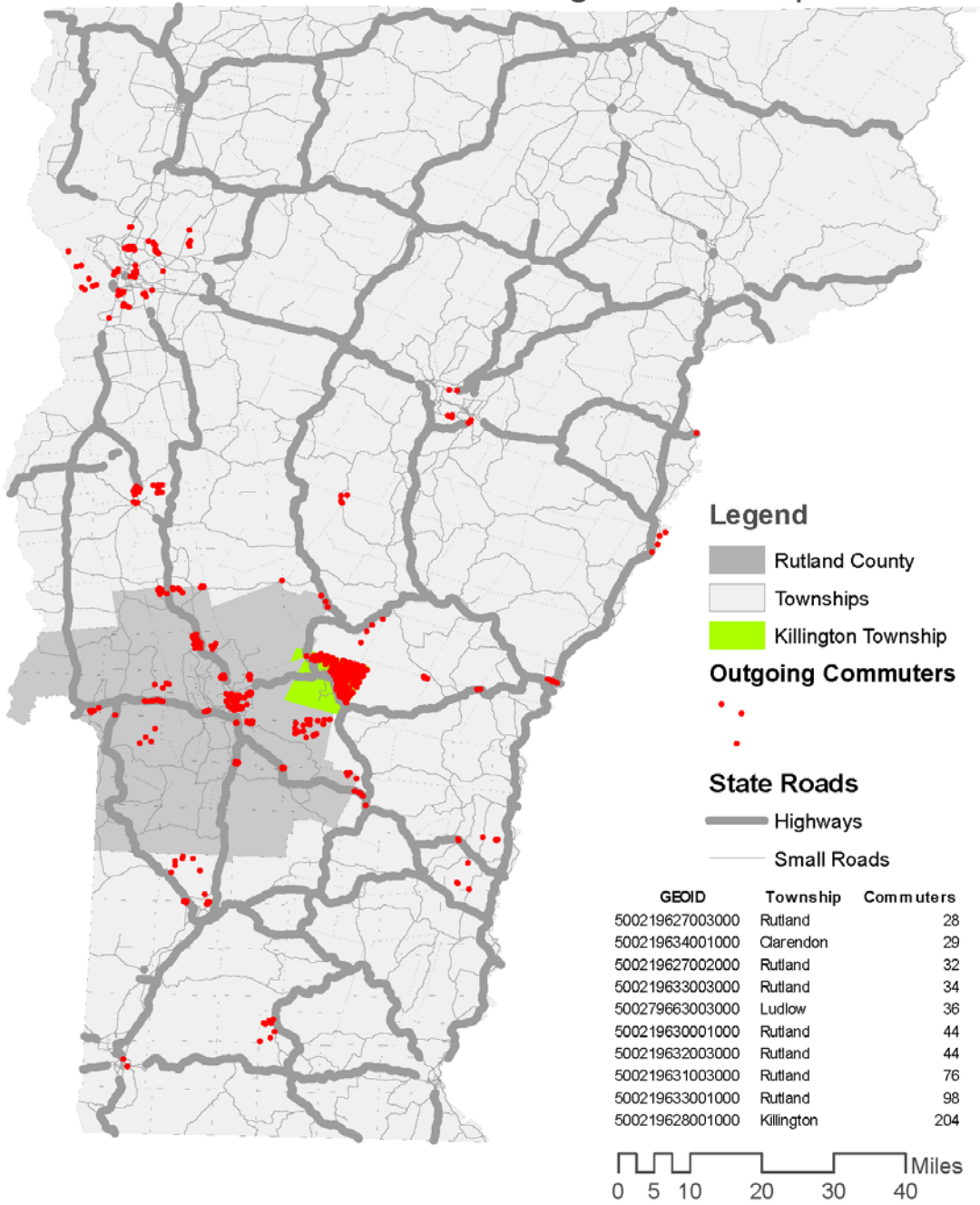
Commuters From Hubbardton Township



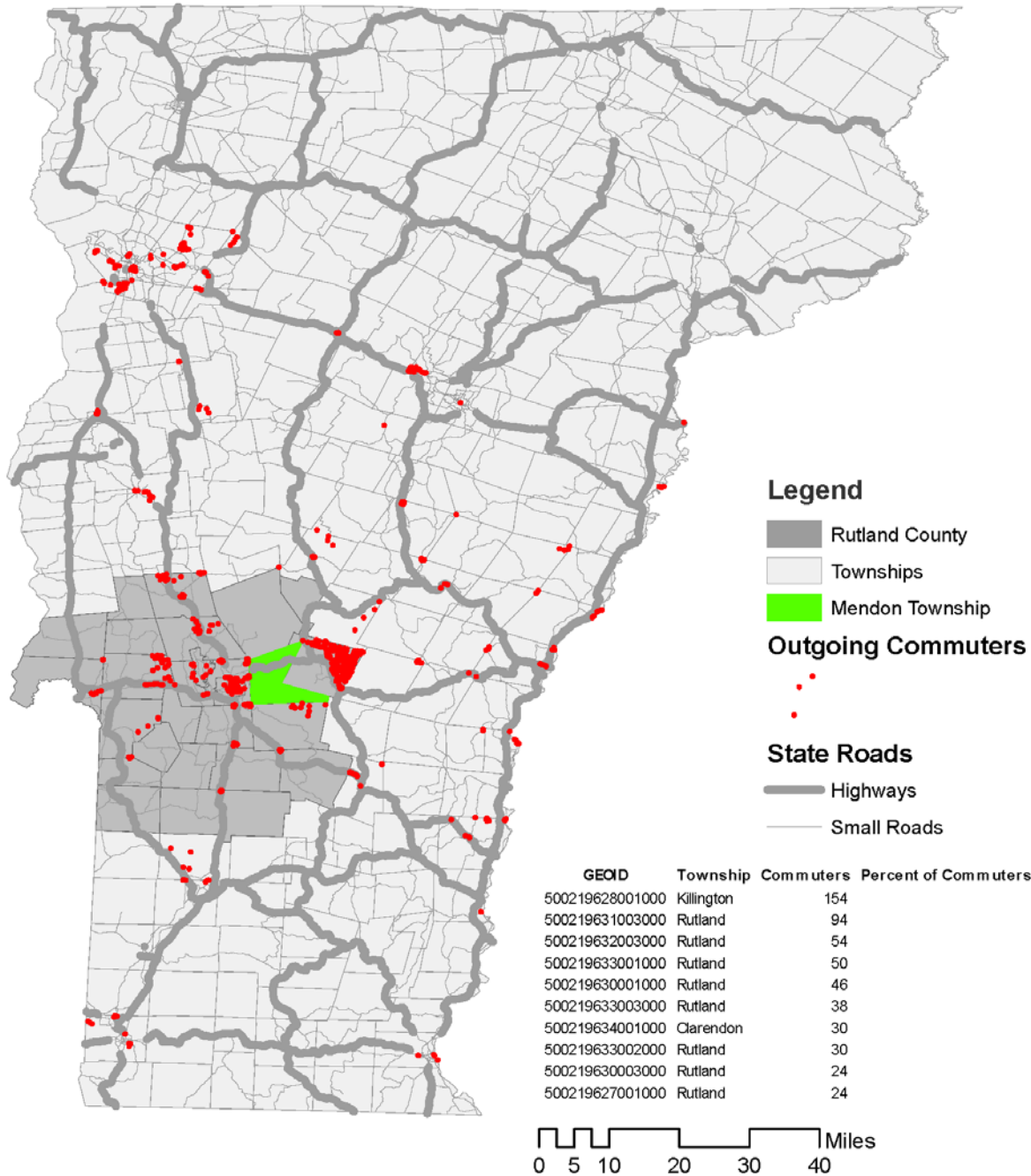
Commuters From Ira Township



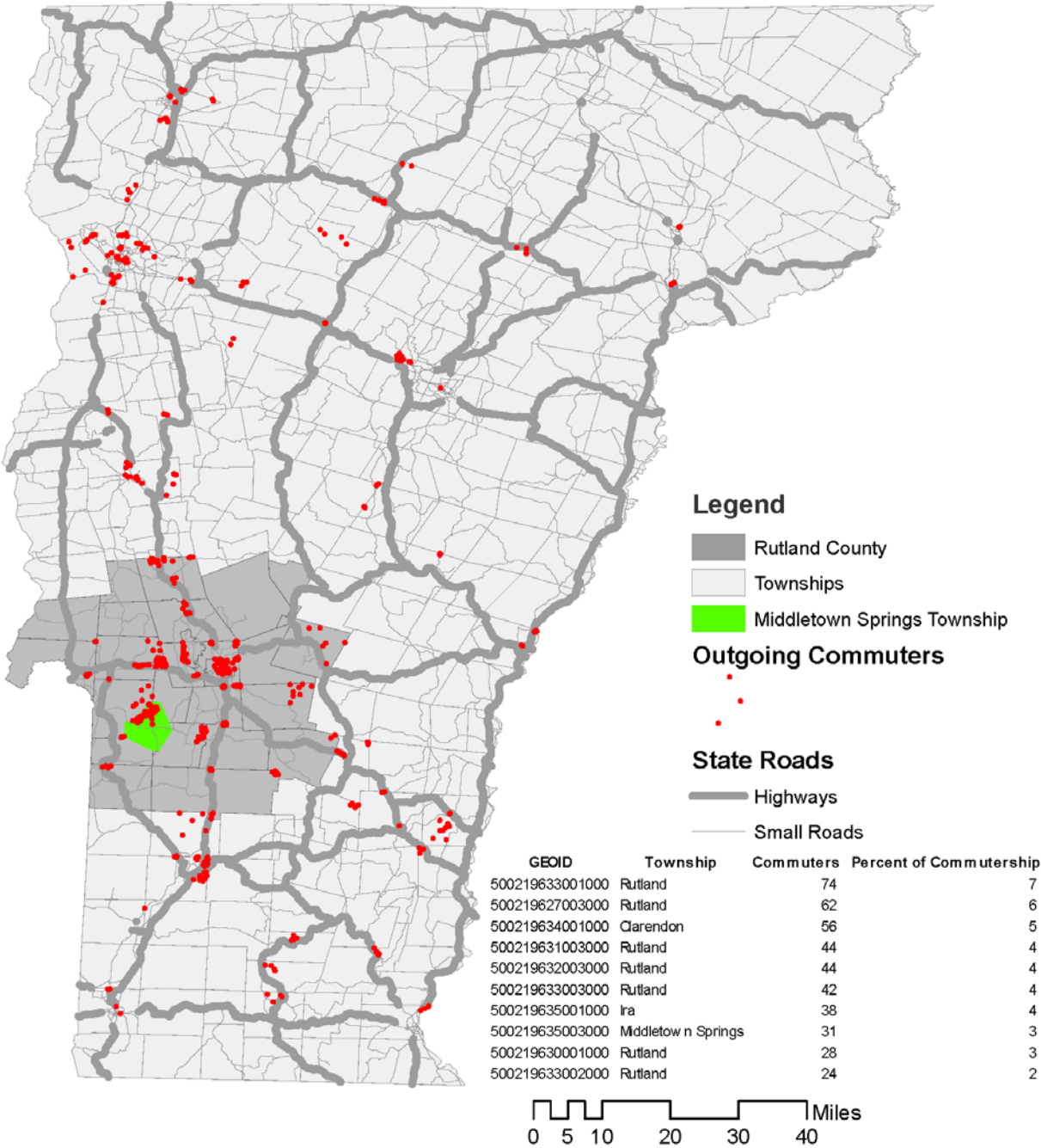
Commuters From Killington Township



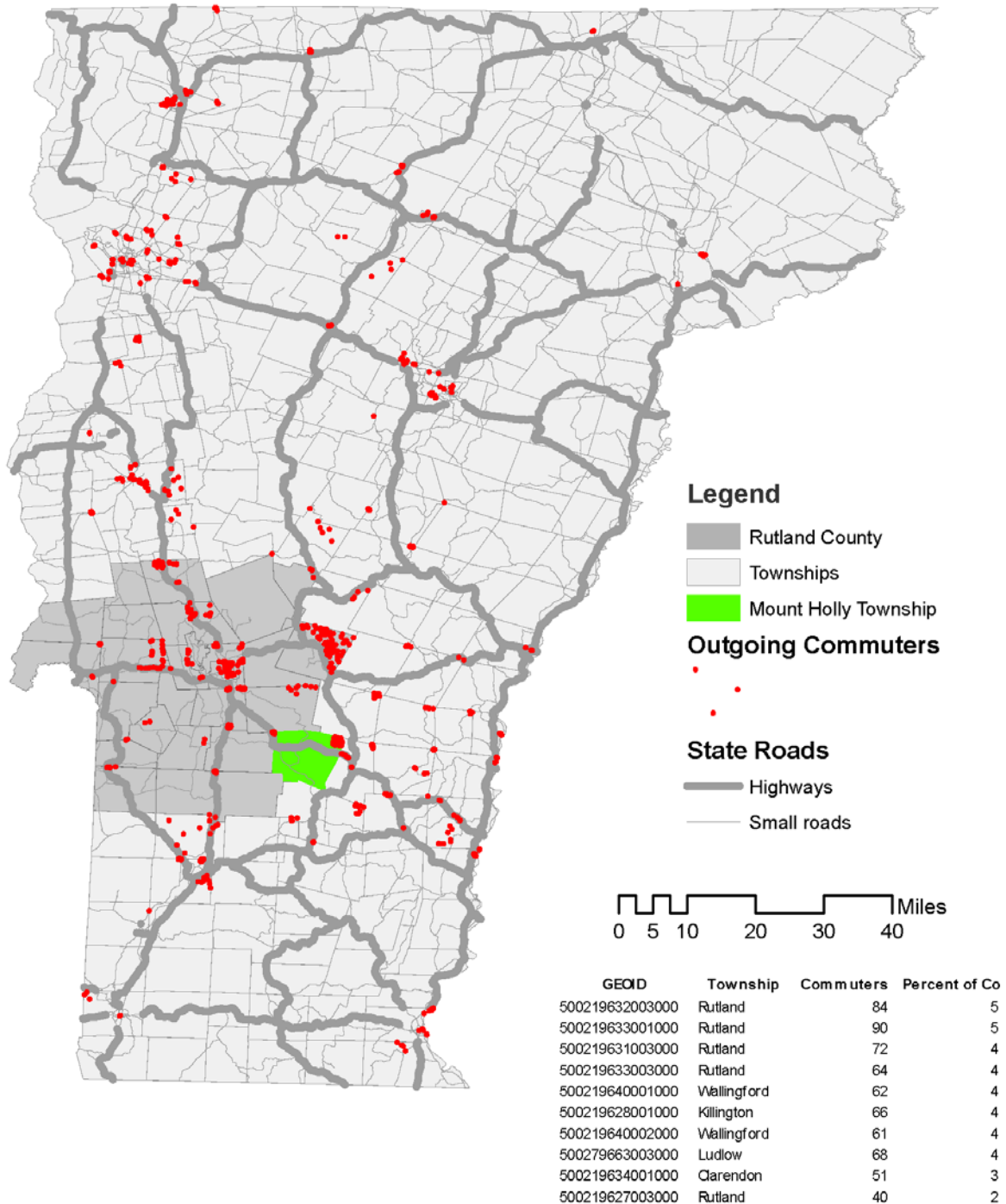
Commuters From Mendon Township



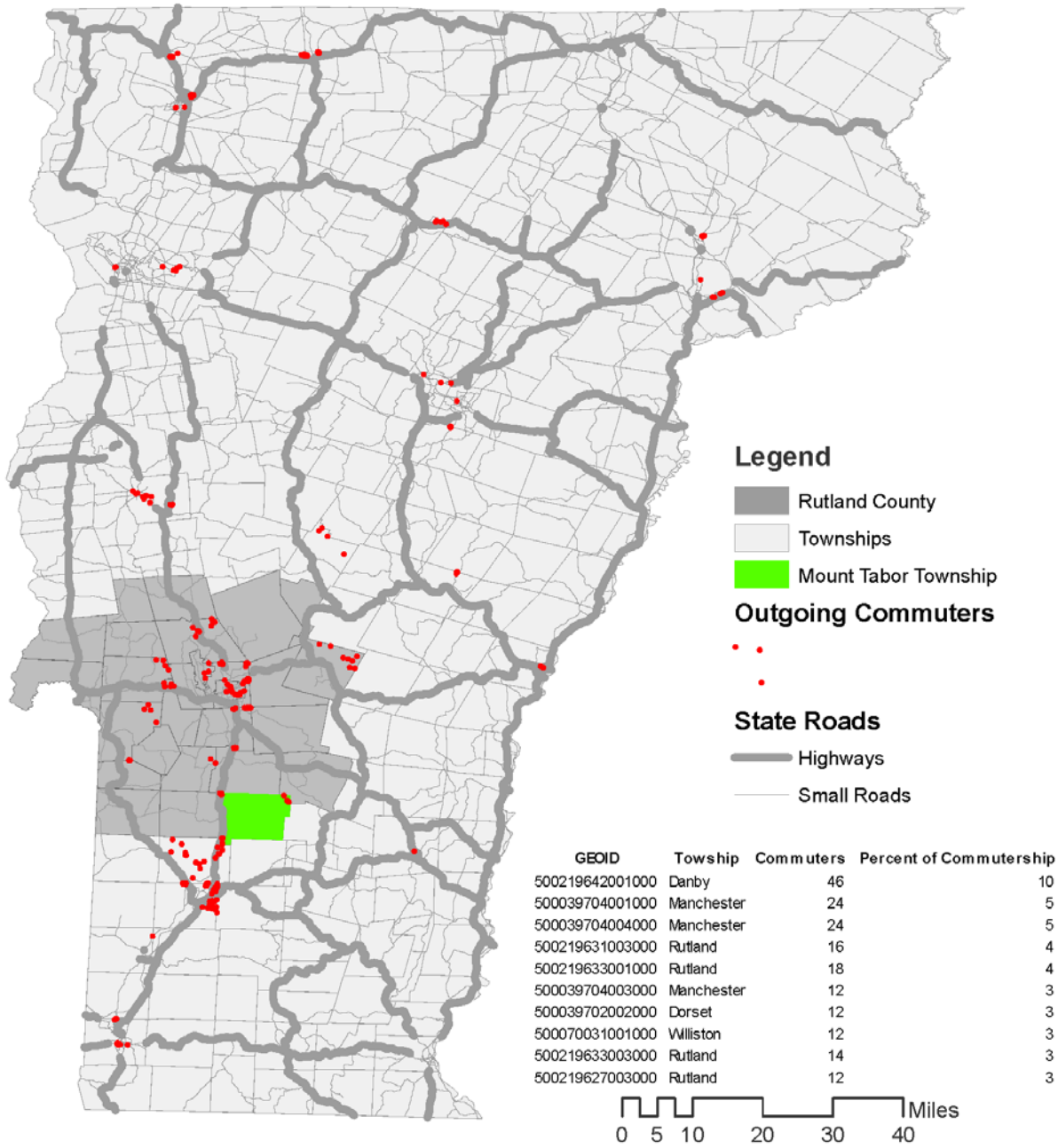
Commuters From Middletown Springs Township



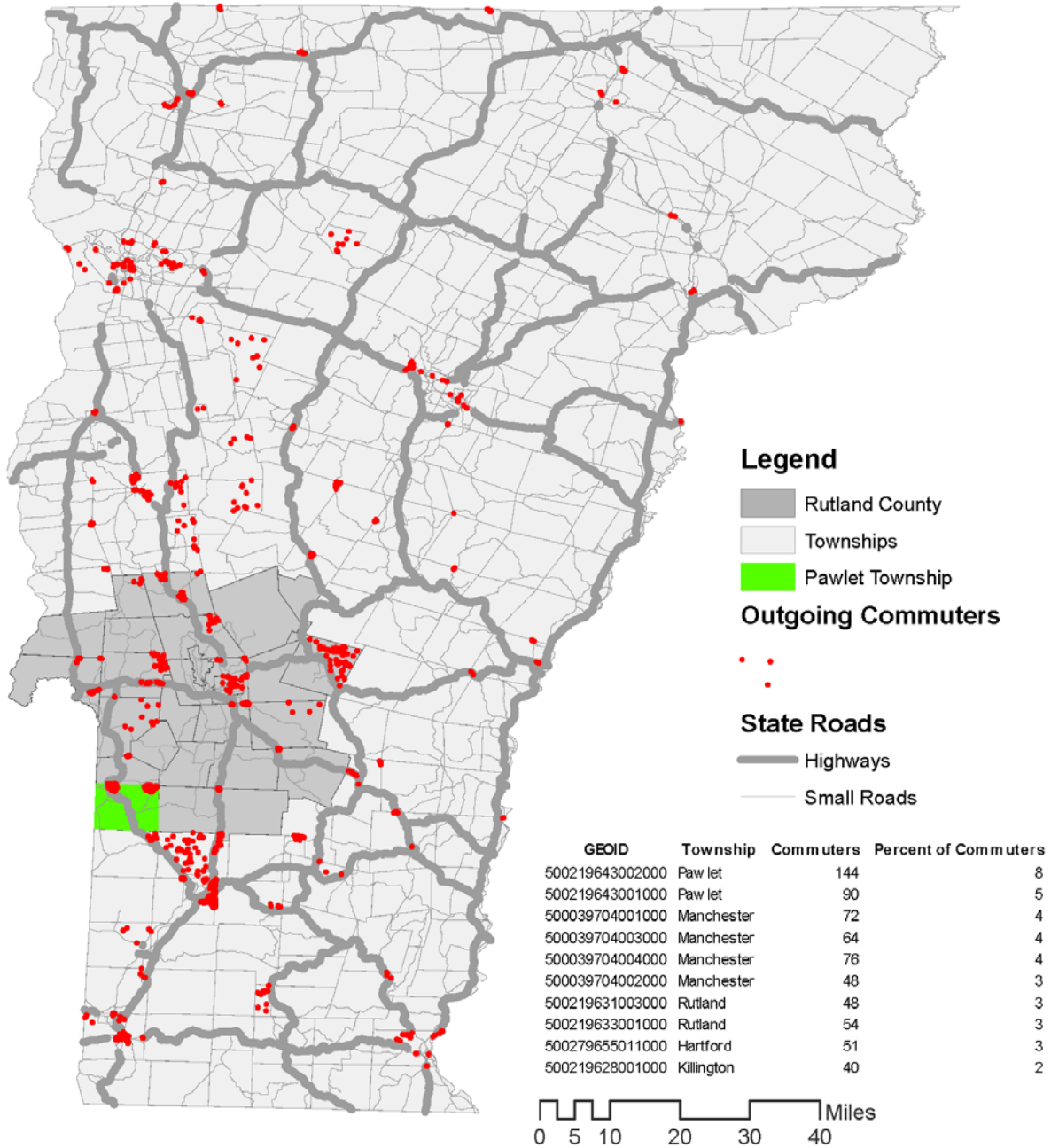
Commuters From Mount Holly Township



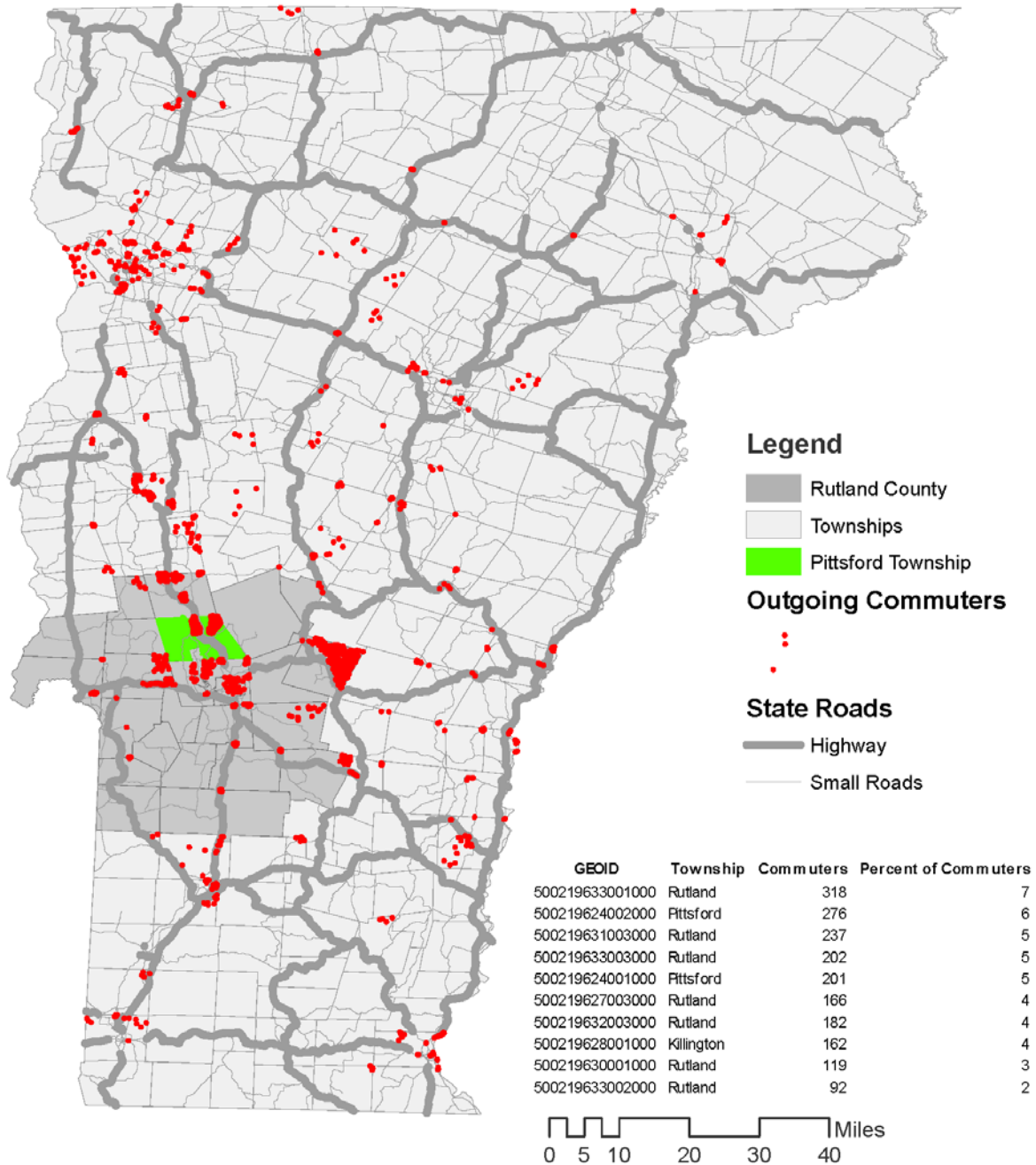
Commuters From Mount Tabor Township



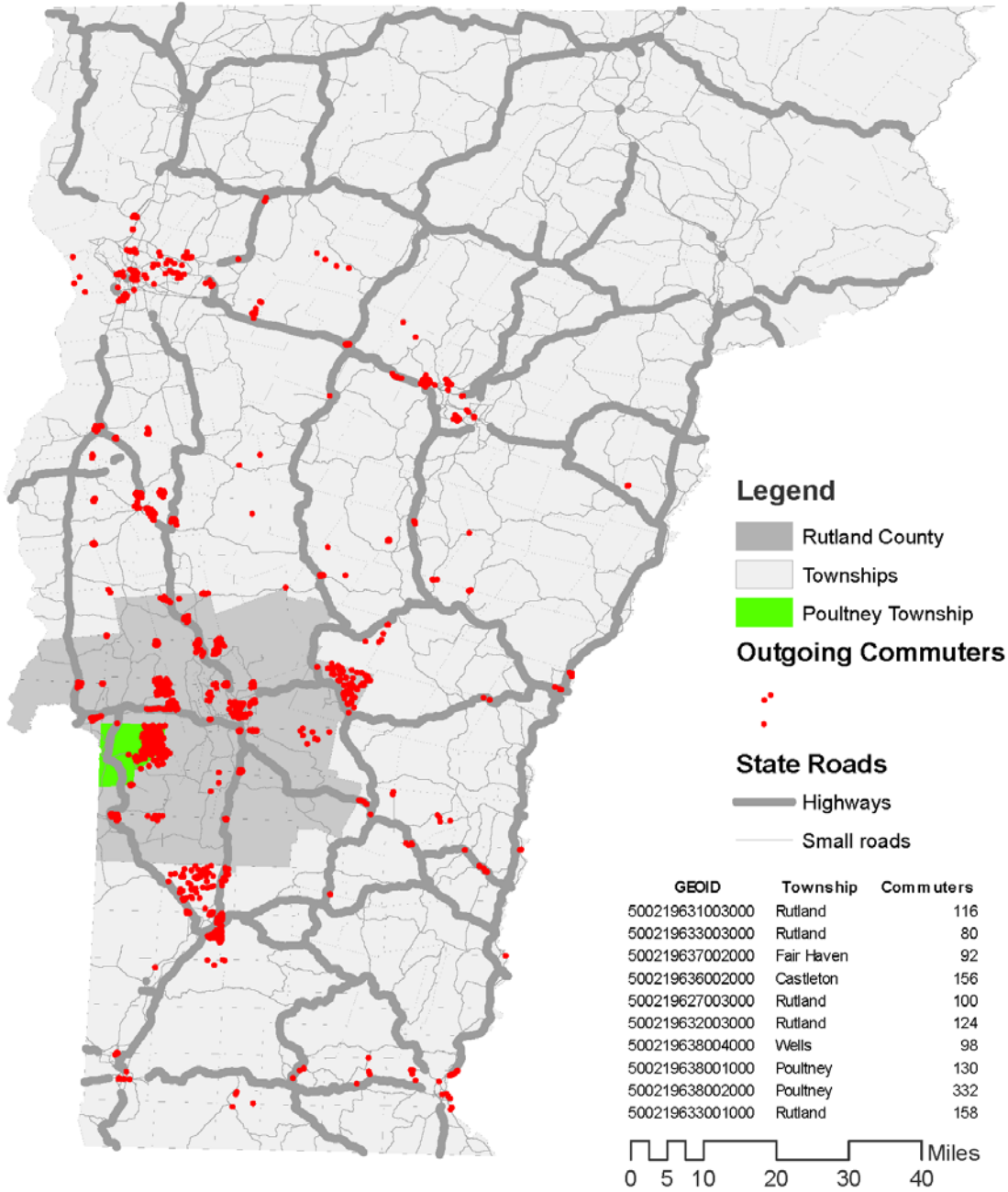
Commuters From Pawlet Township



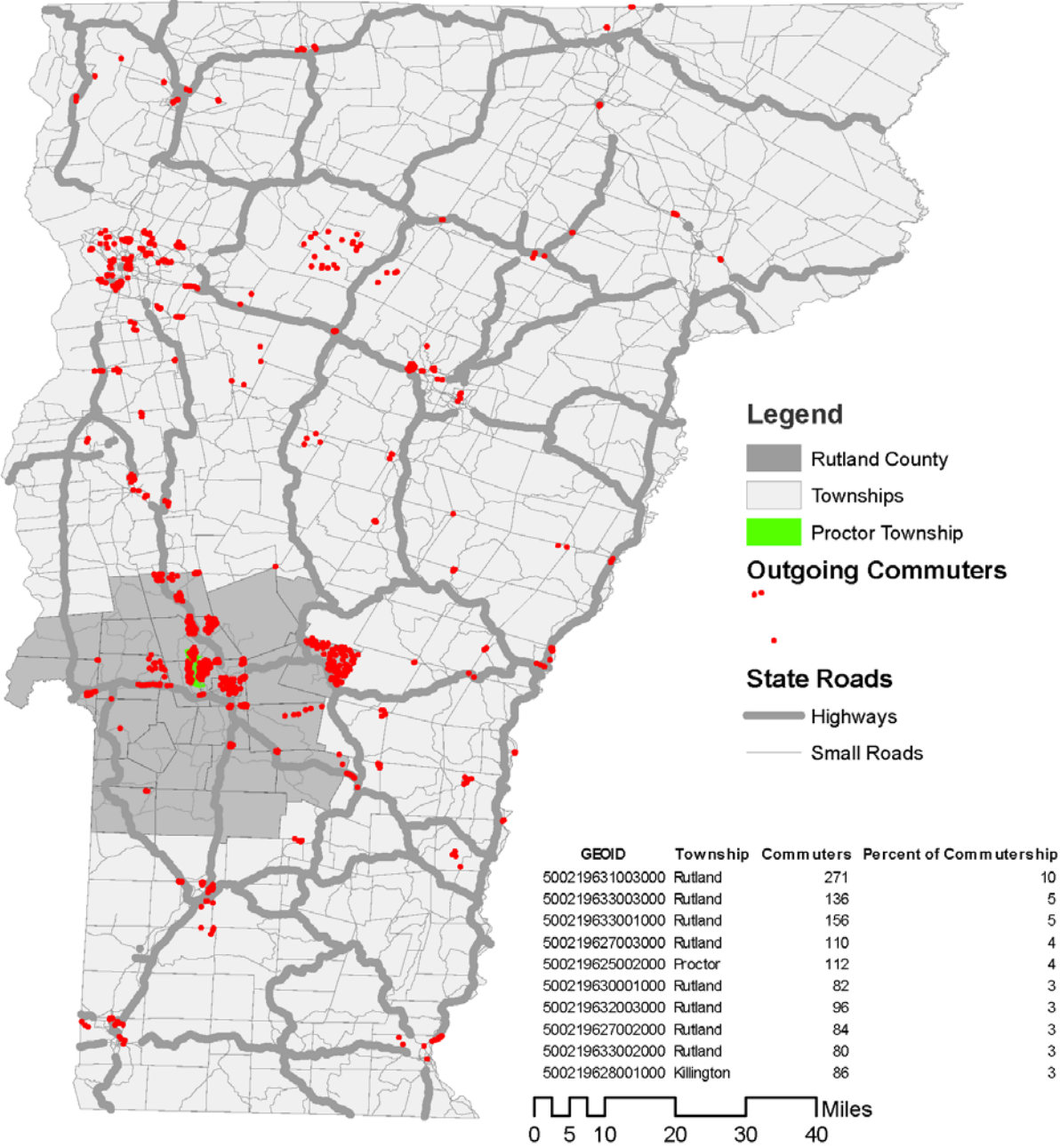
Commuters From Pittsford Township



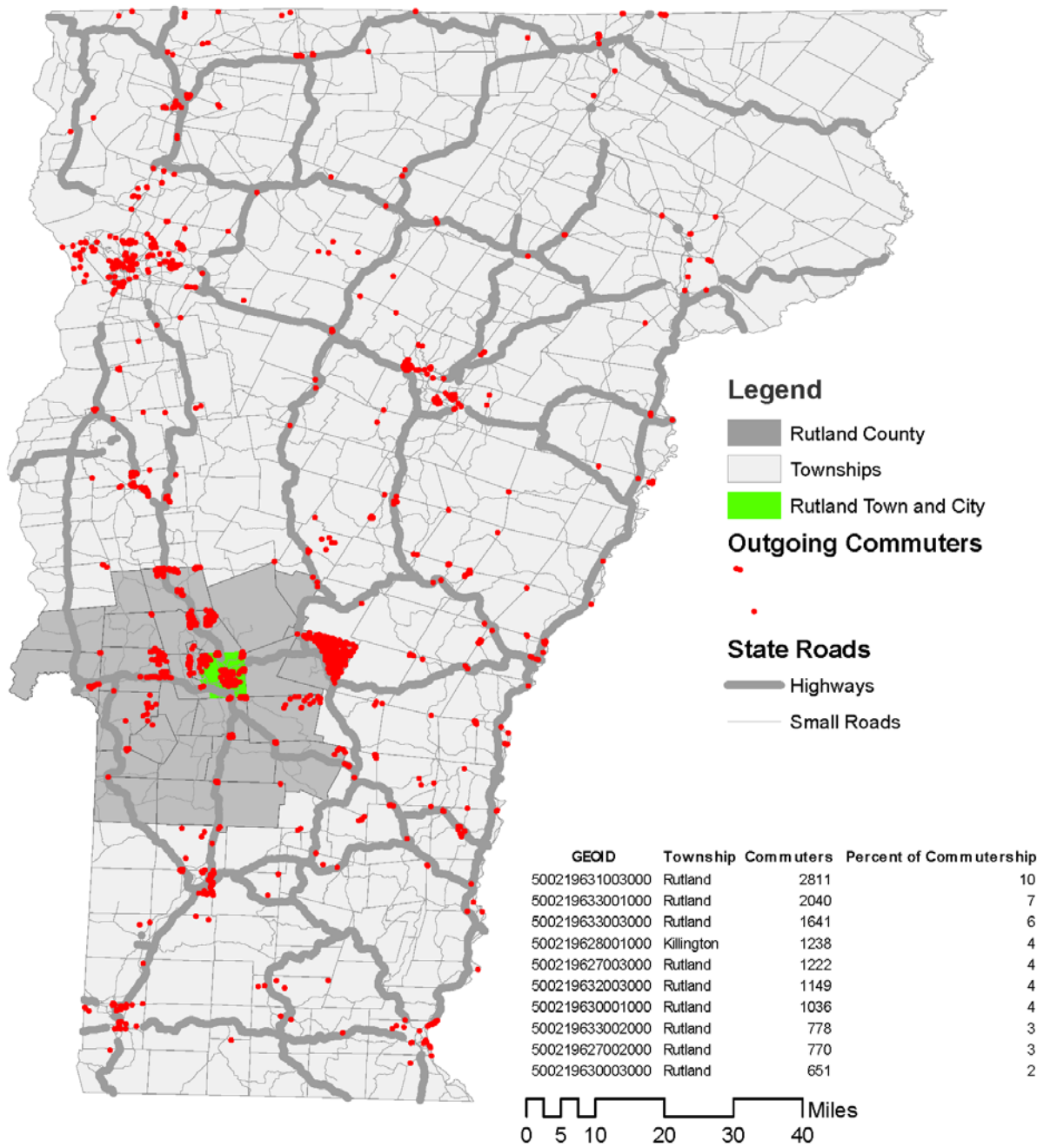
Commuters From Poultney Township



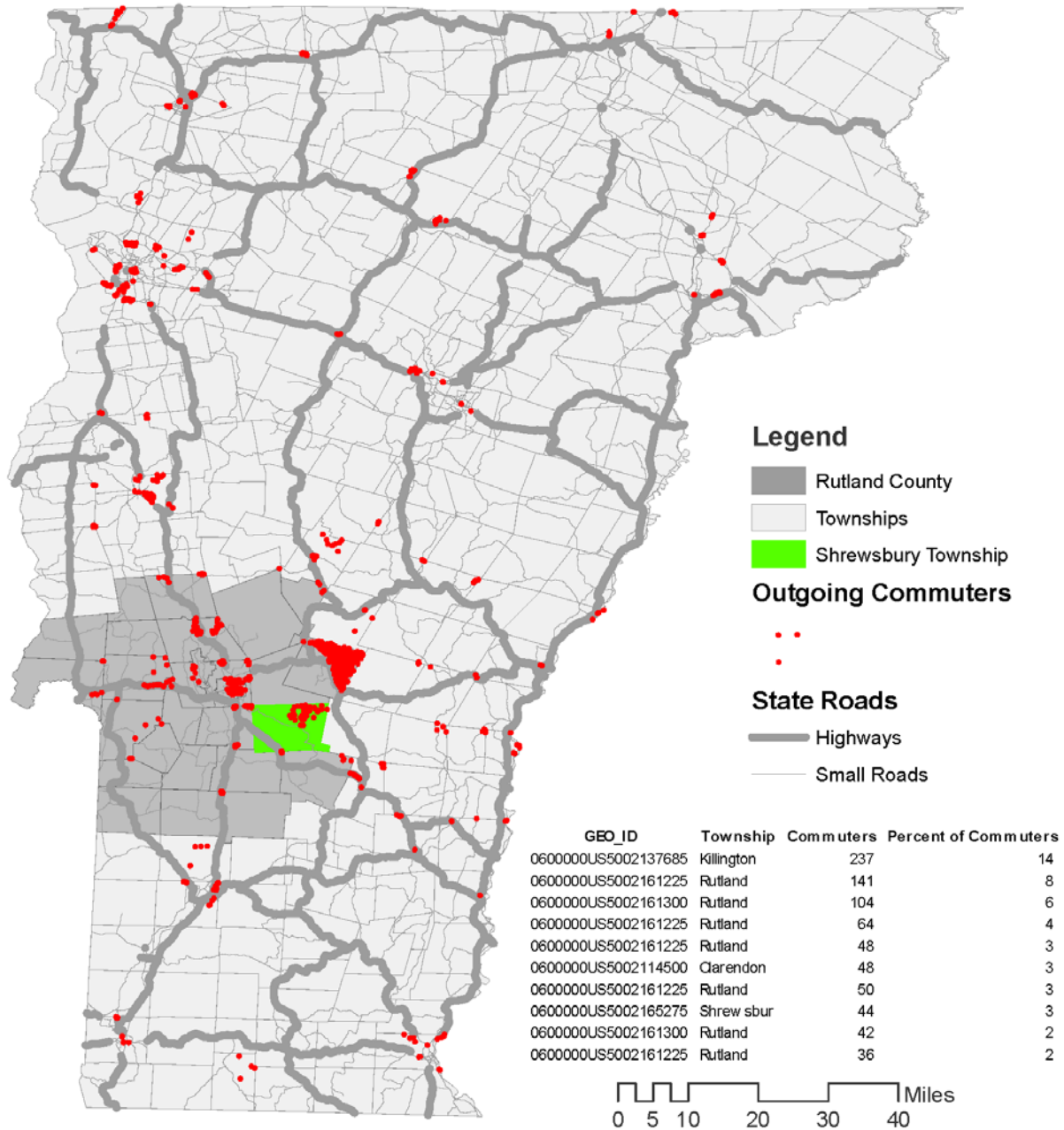
Commuters From Proctor Township



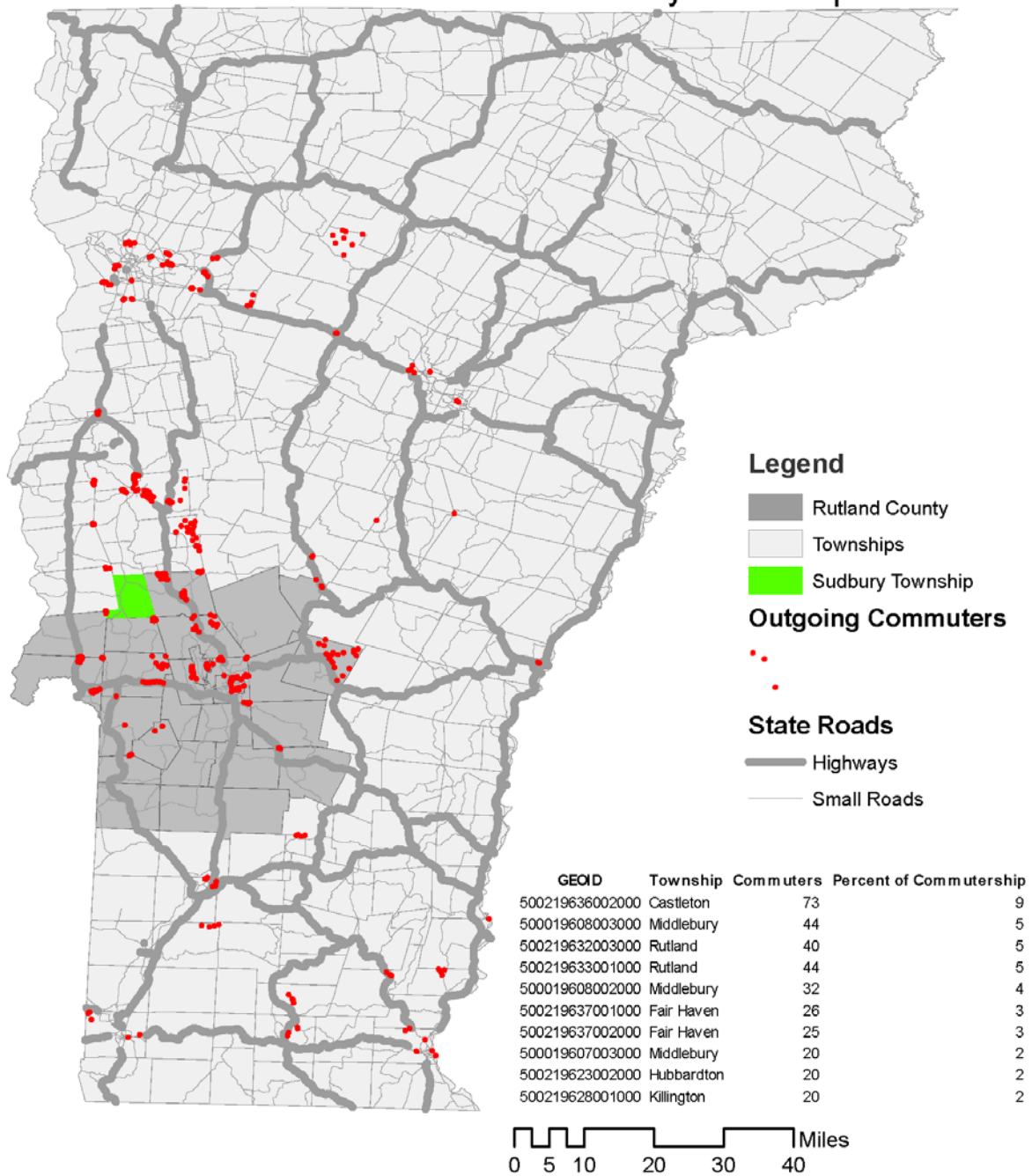
Commuters From Rutland Town and City



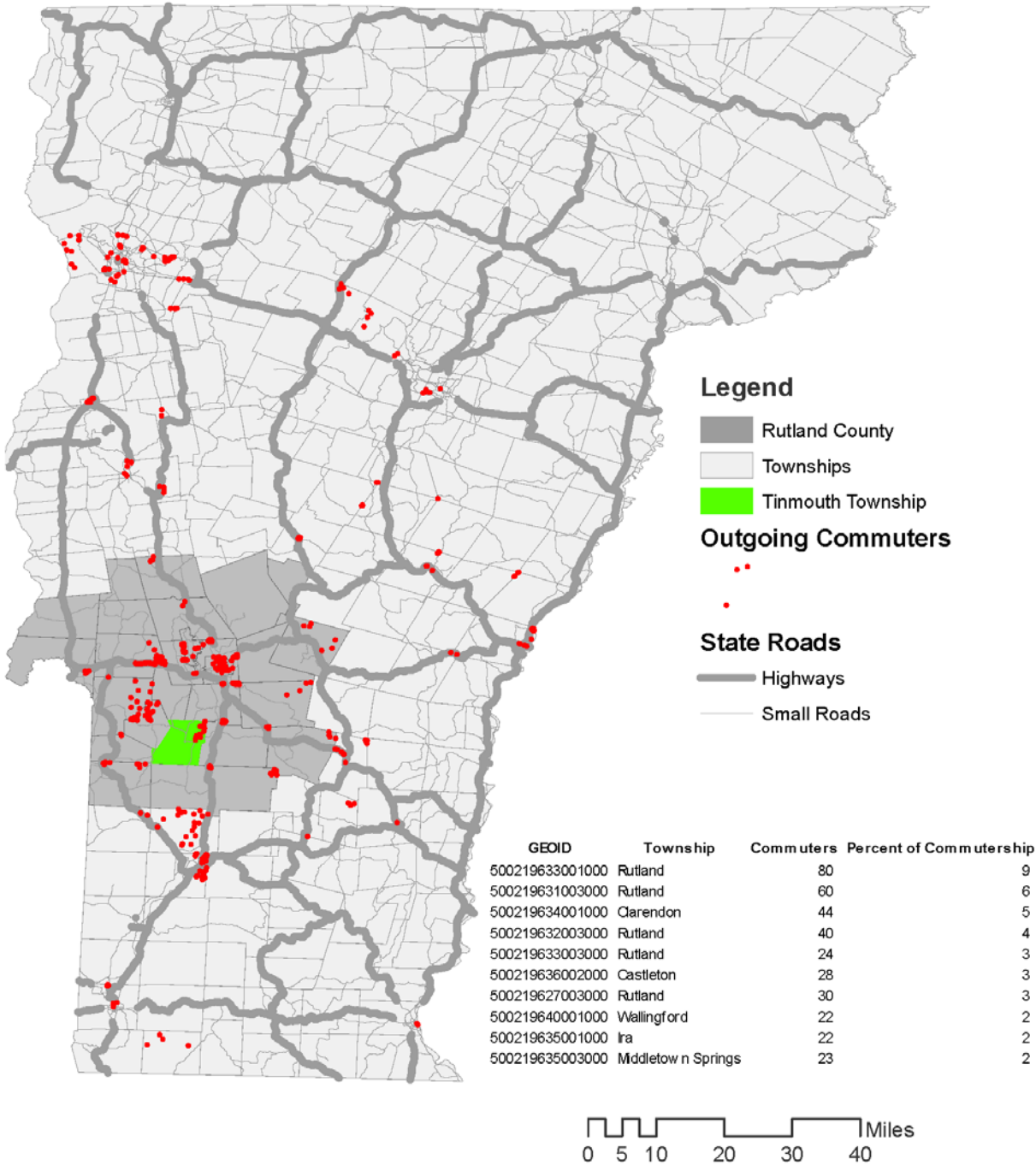
Commuters From Shrewsbury Township



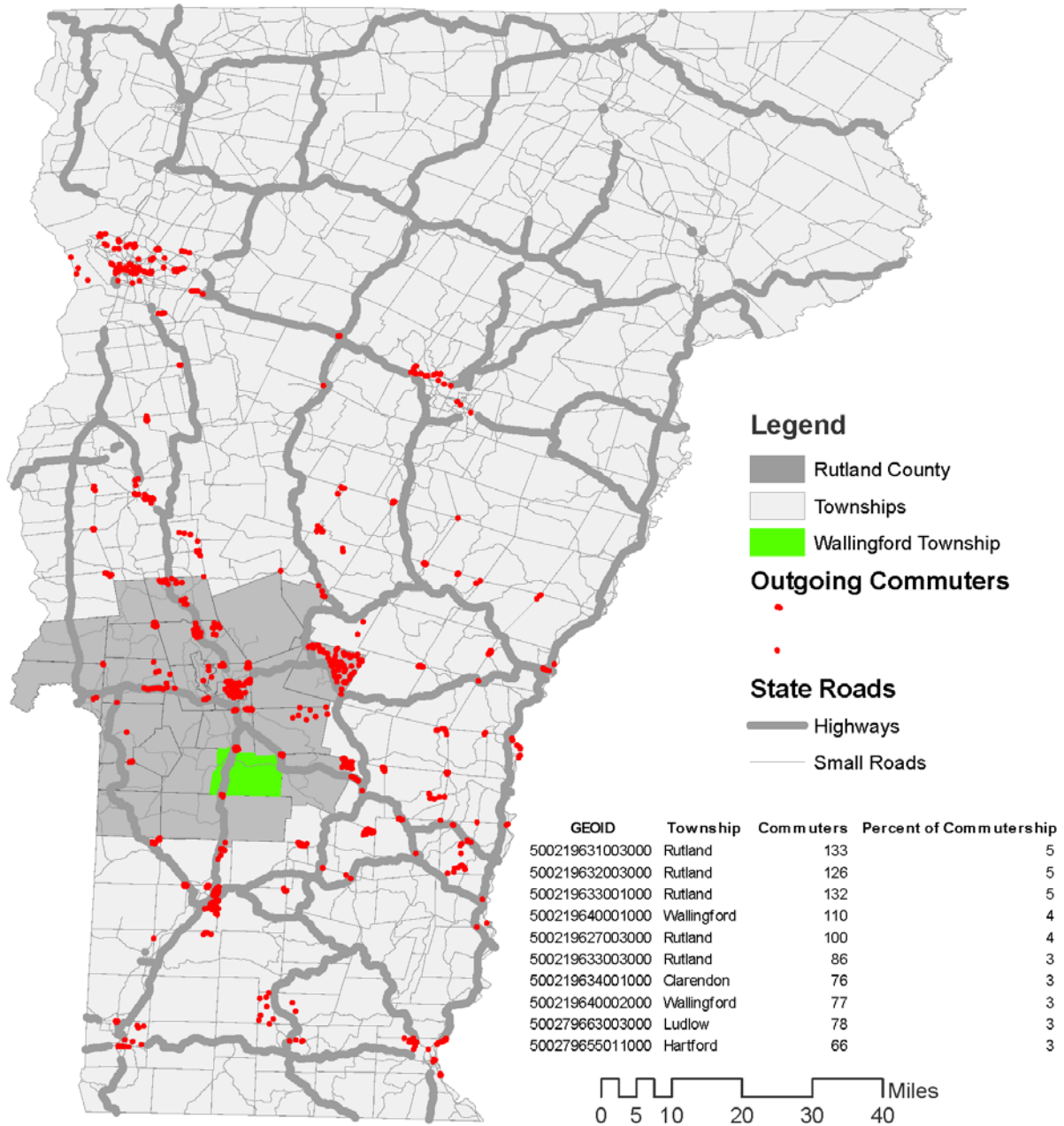
Commuters From Sudbury Township



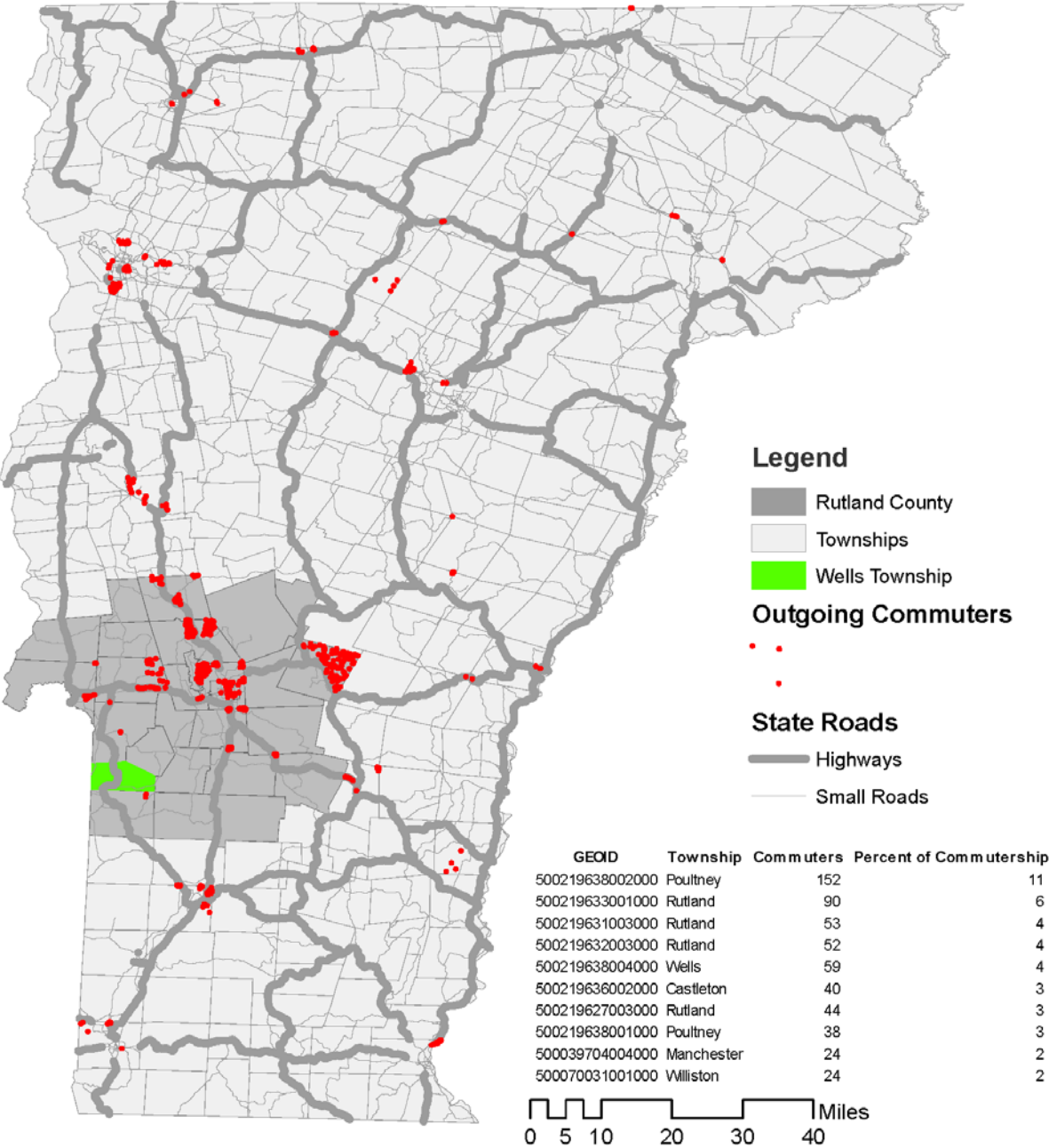
Commuters From Tinmouth Township



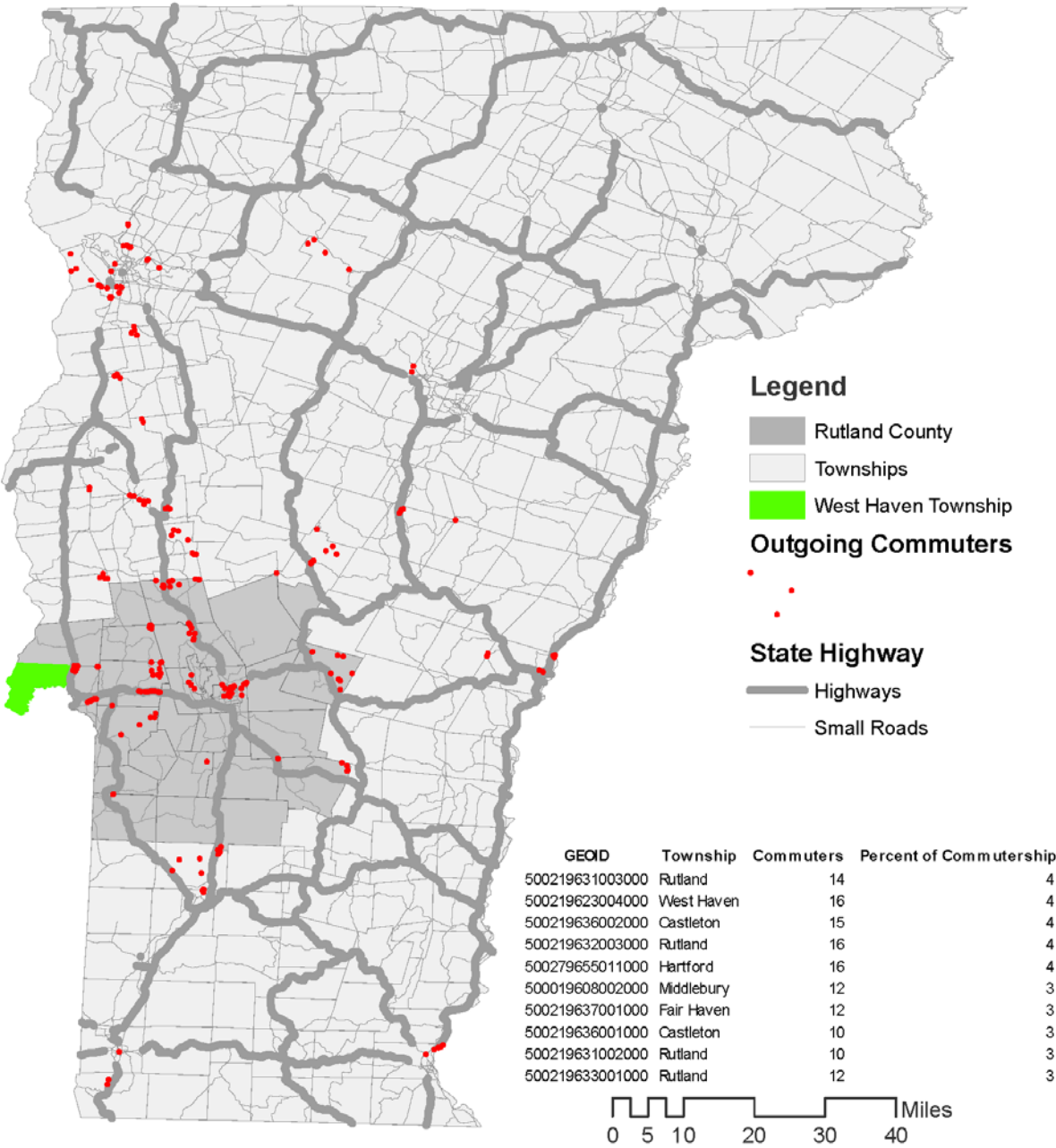
Commuters From Wallingford Township



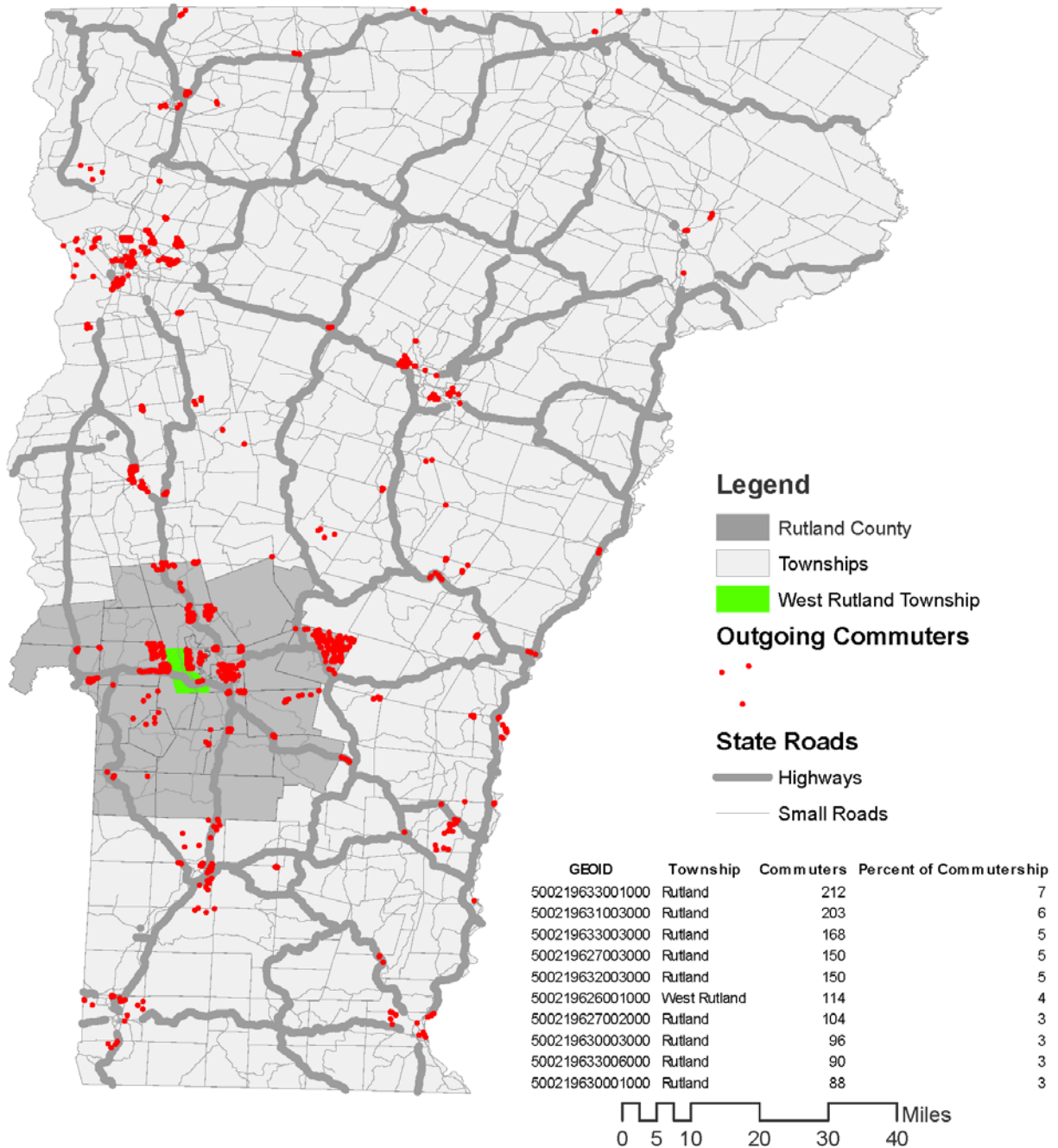
Commuters From Wells Township



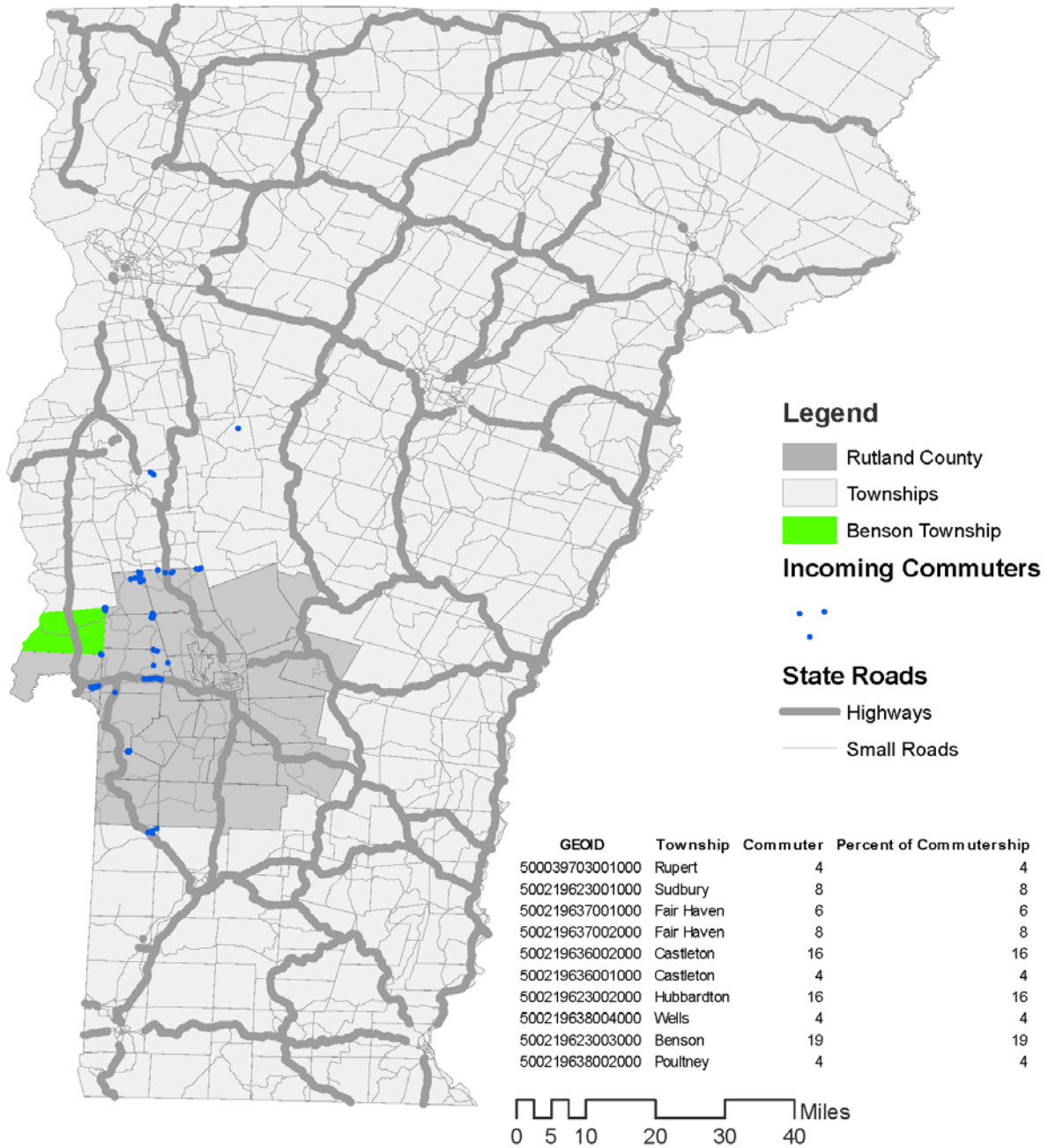
Commuters From West Haven Township



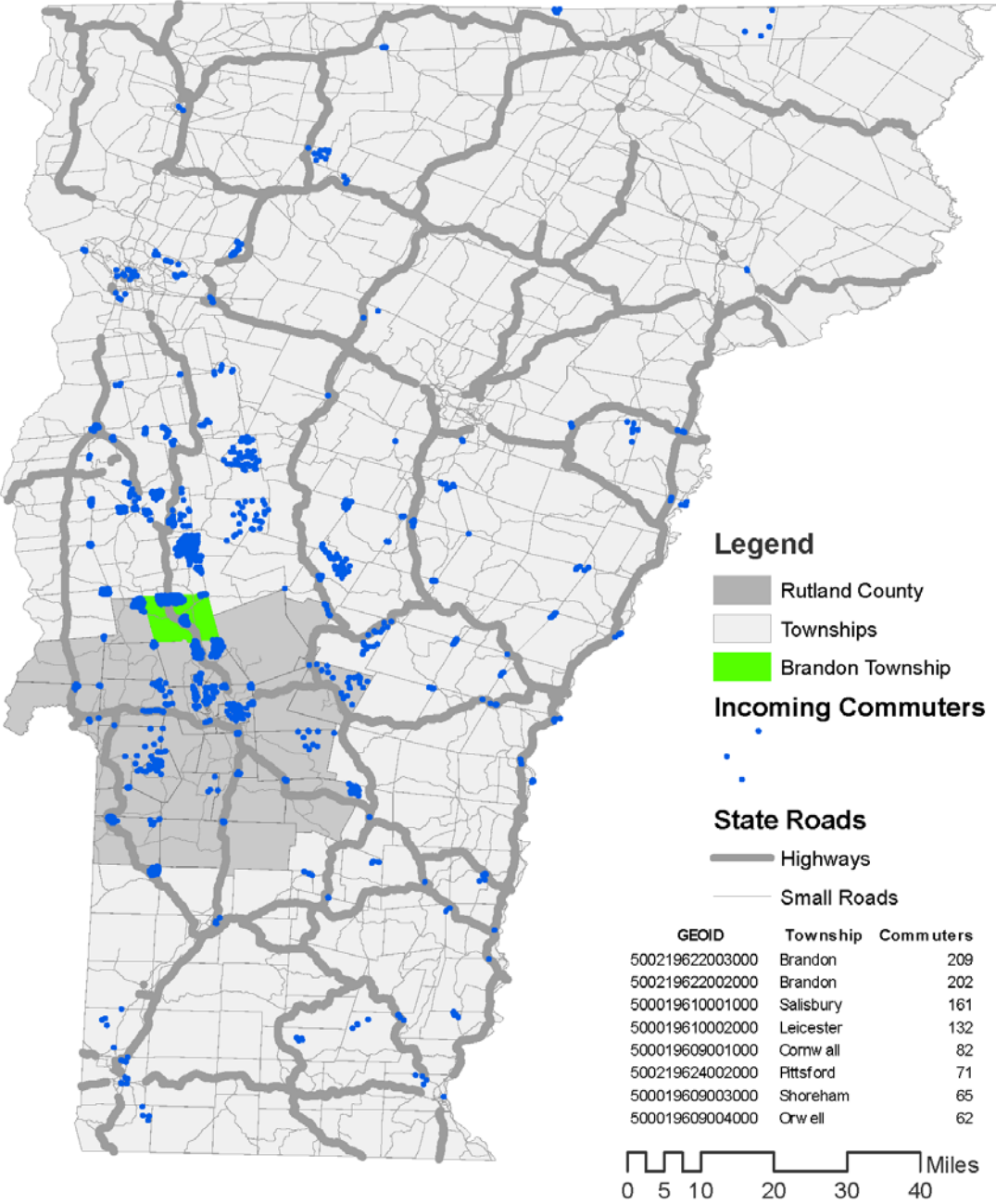
Commuters From West Rutland Township



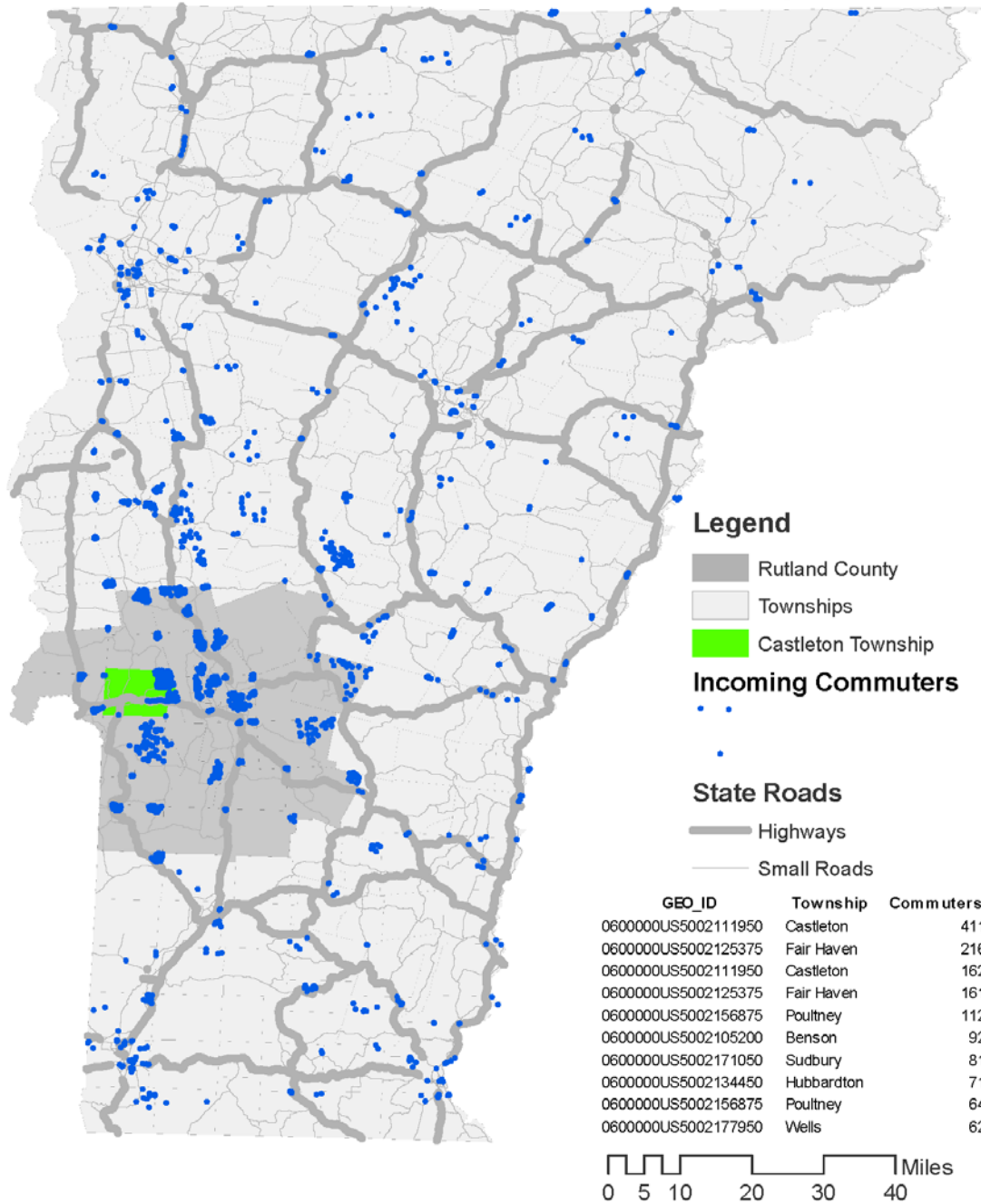
Commuters To Benson Township



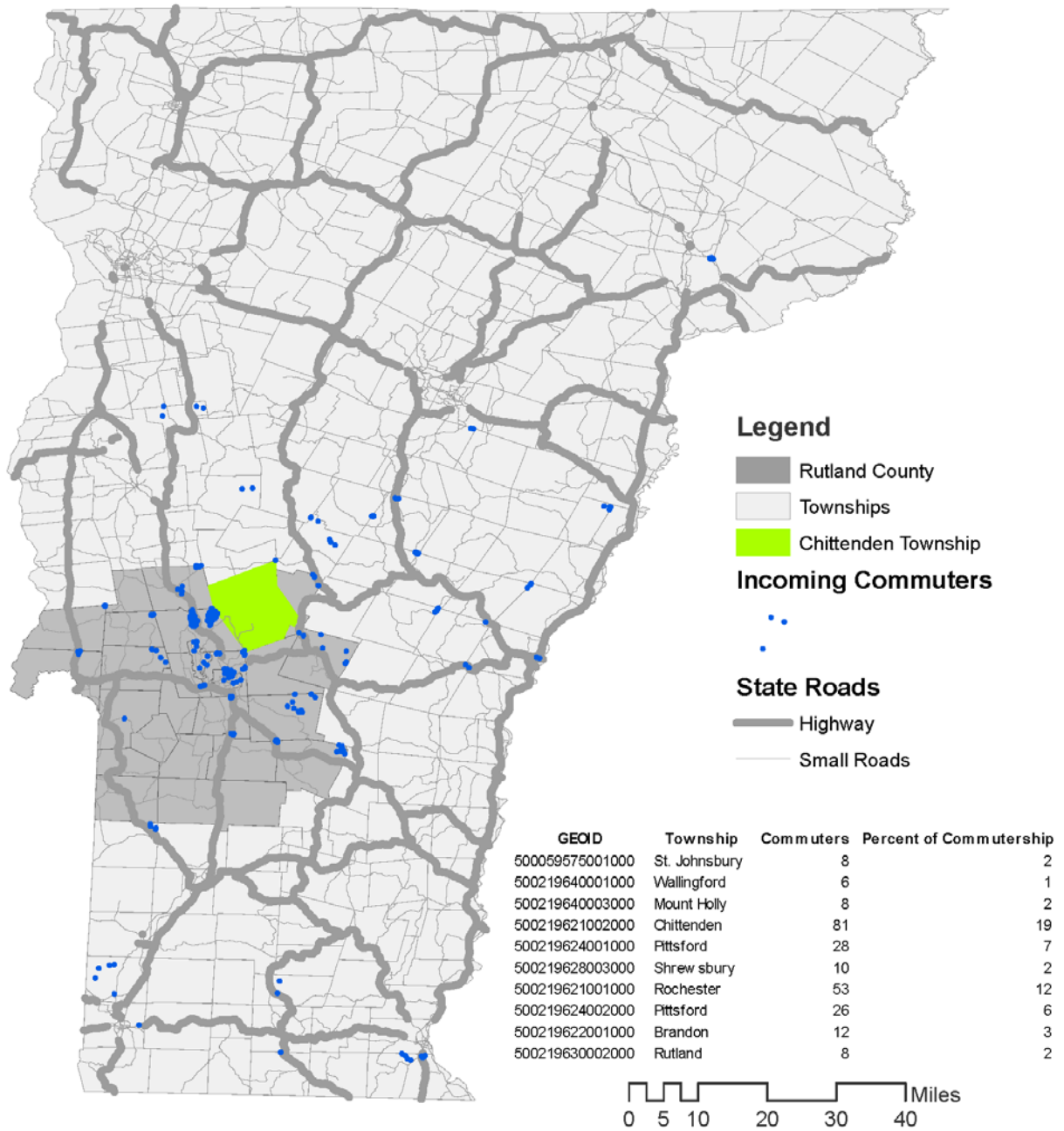
Commuters To Brandon Township



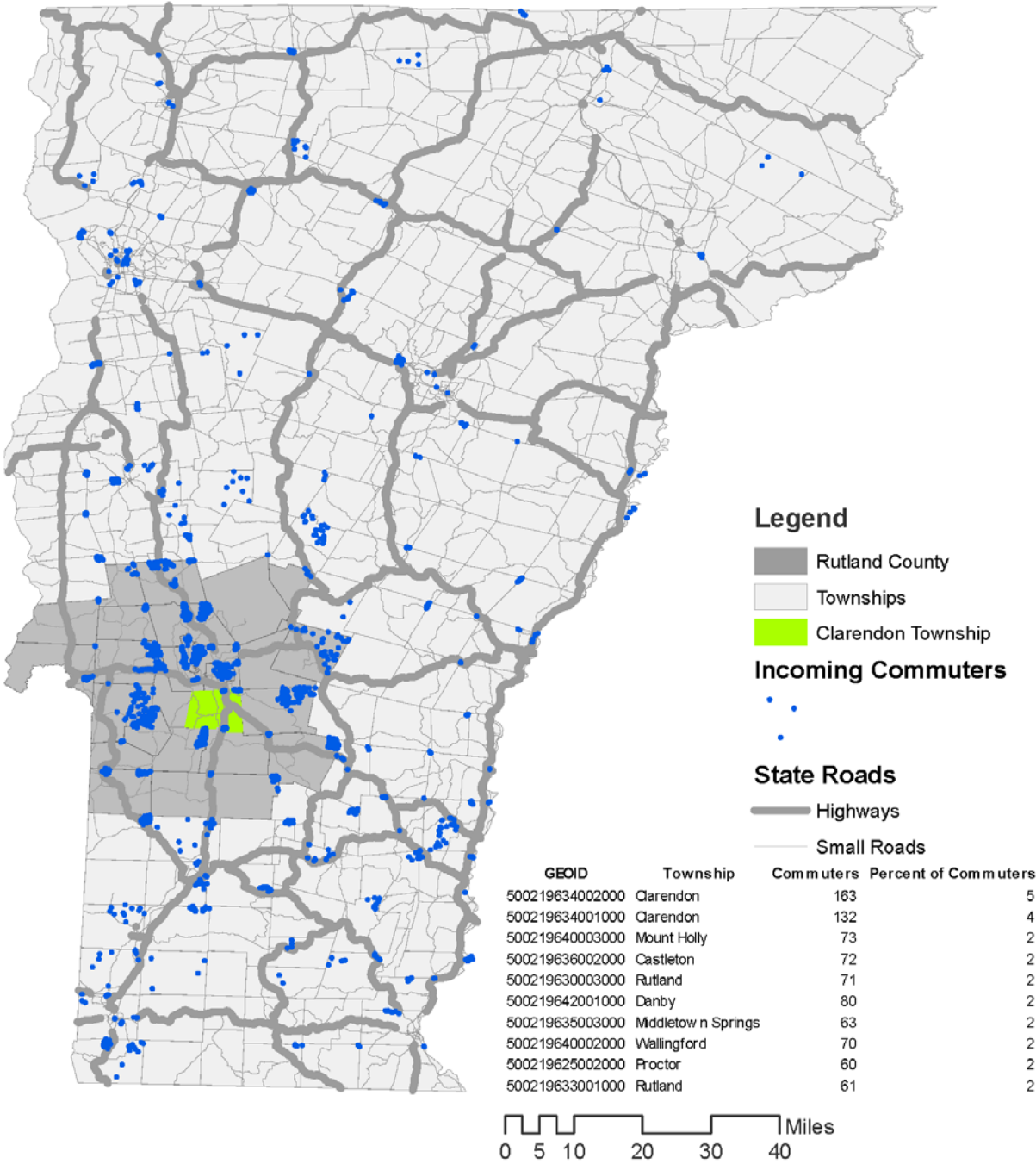
Commuters To Castleton Township



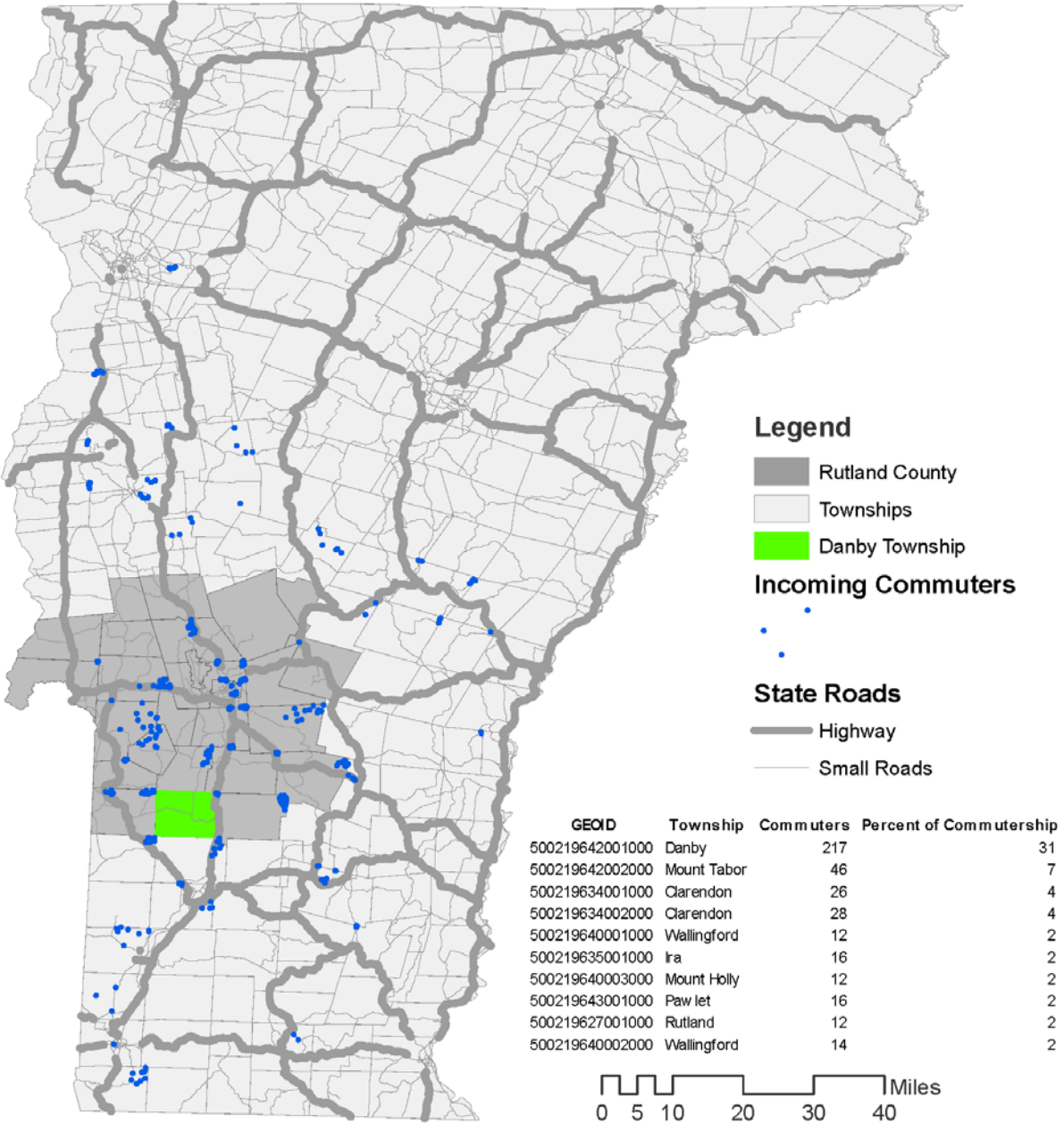
Commuters To Chittenden Township



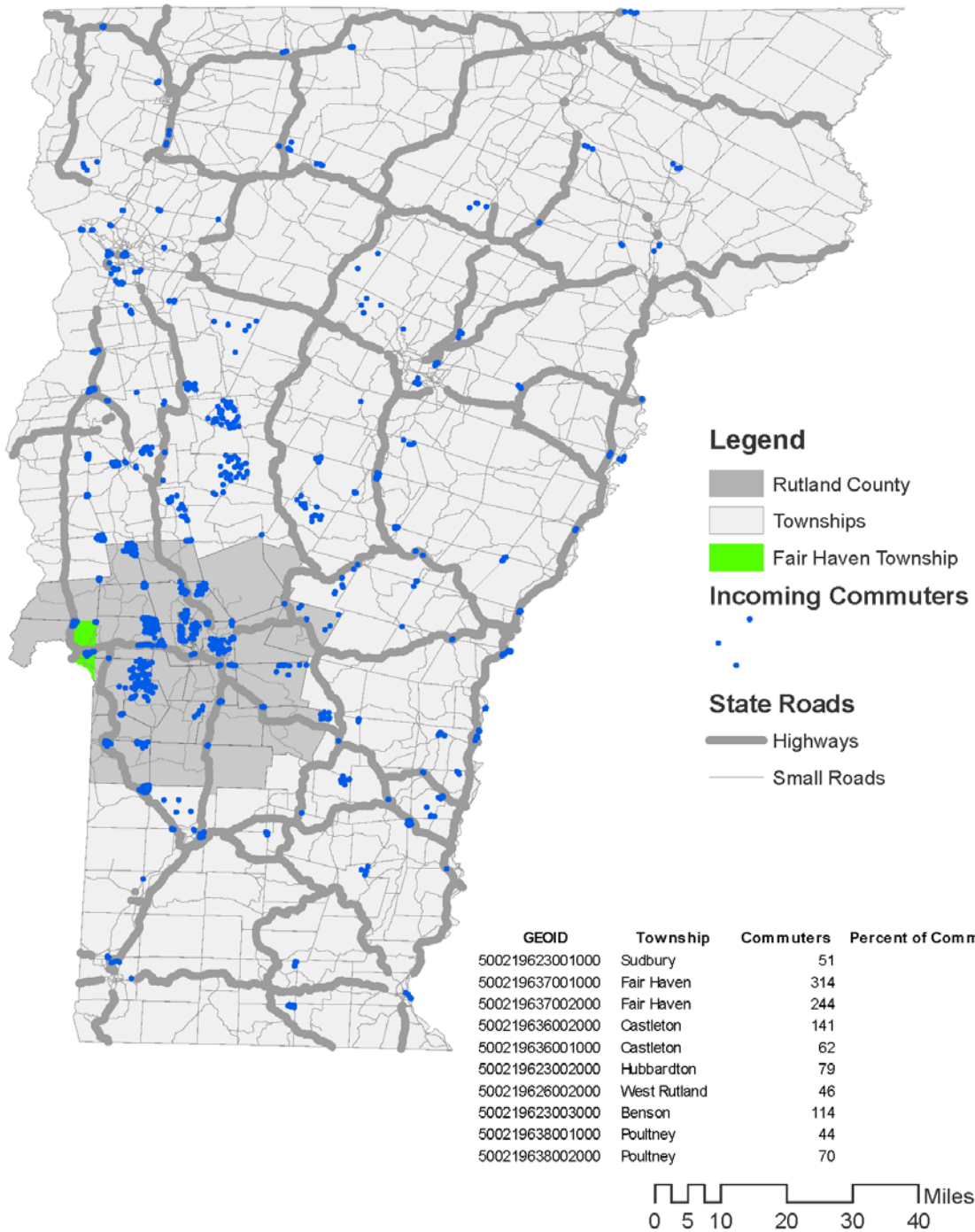
Commuters To Clarendon Township



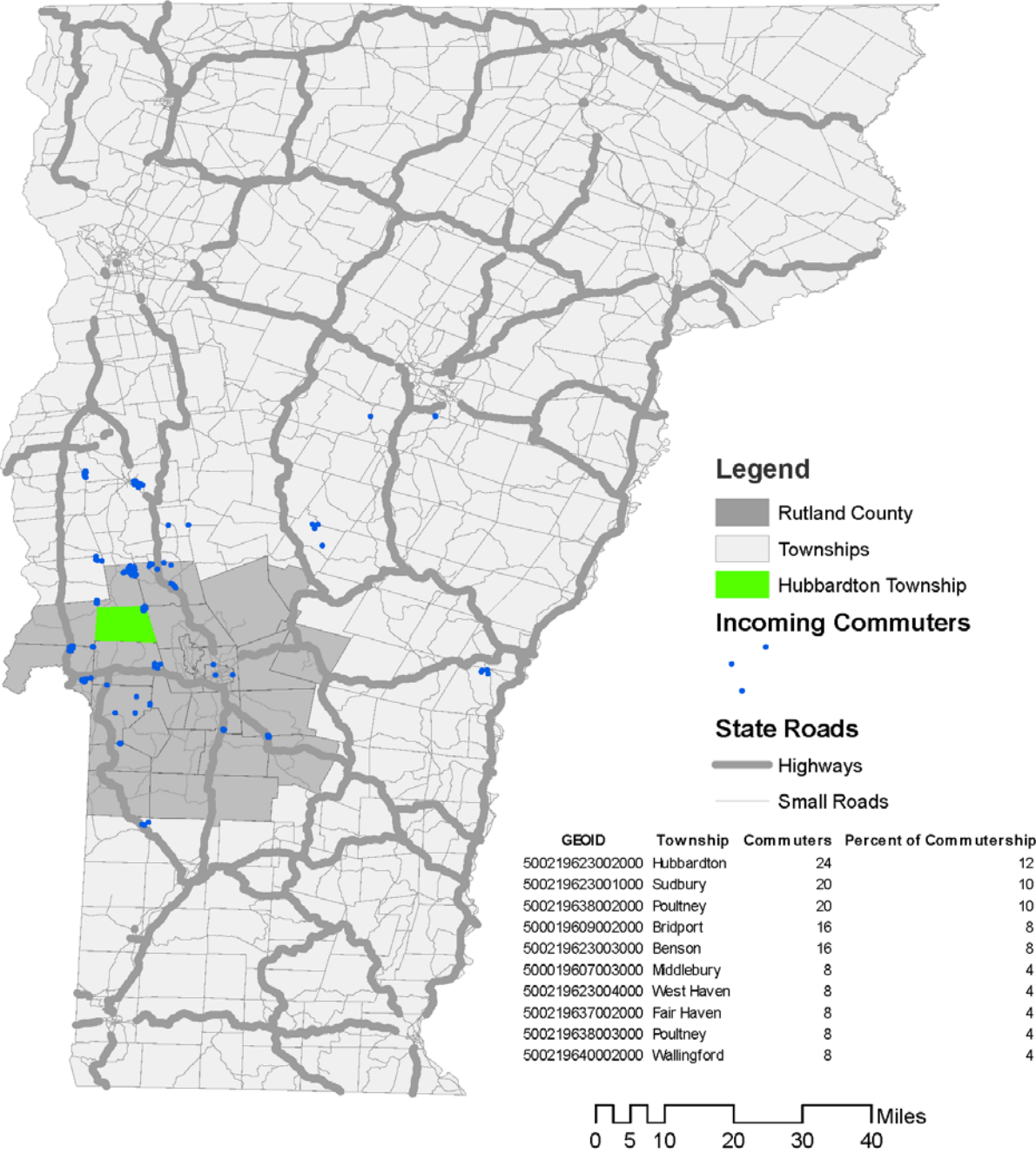
Commuters To Danby Township



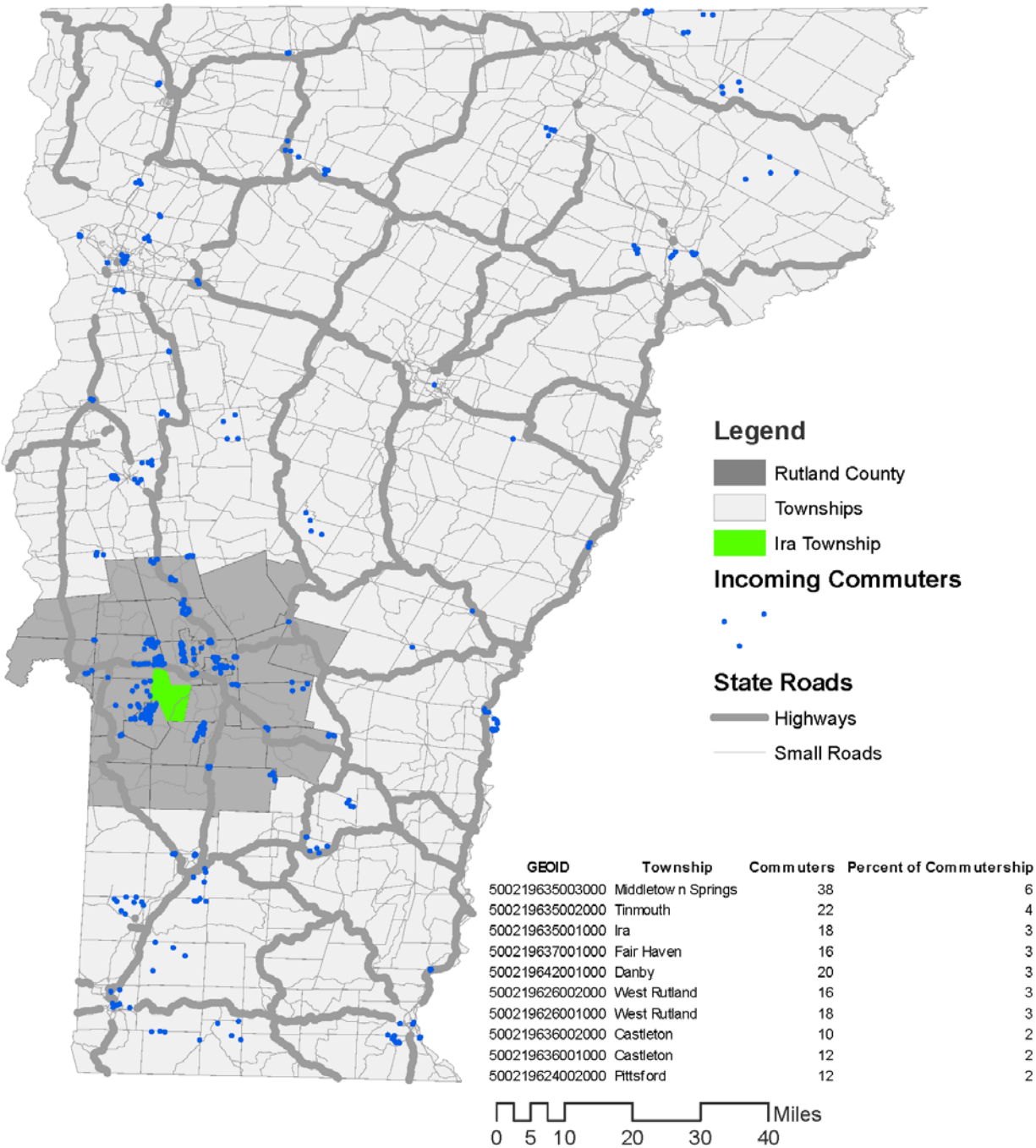
Commuters To Fair Haven Township



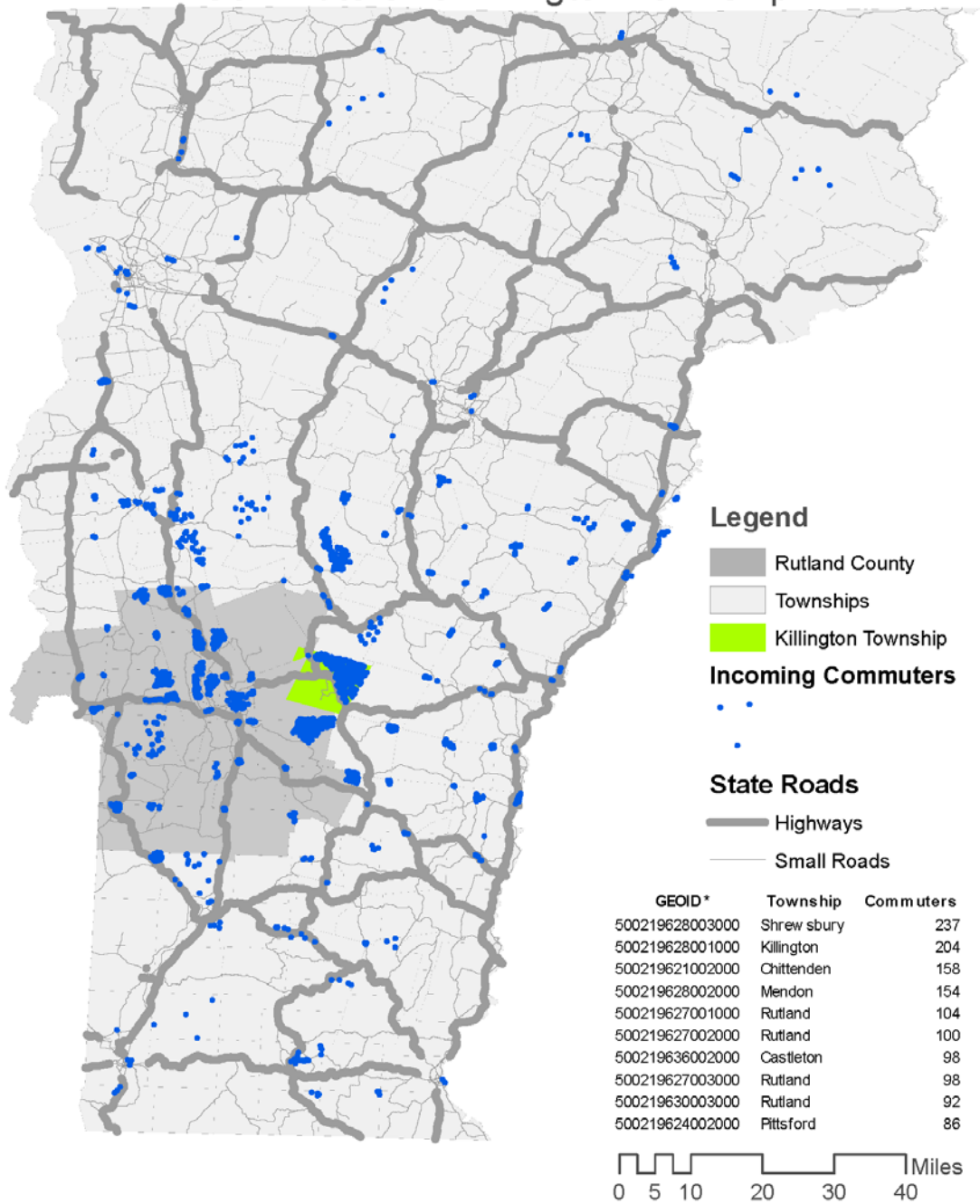
Commuters To Hubbardton Township



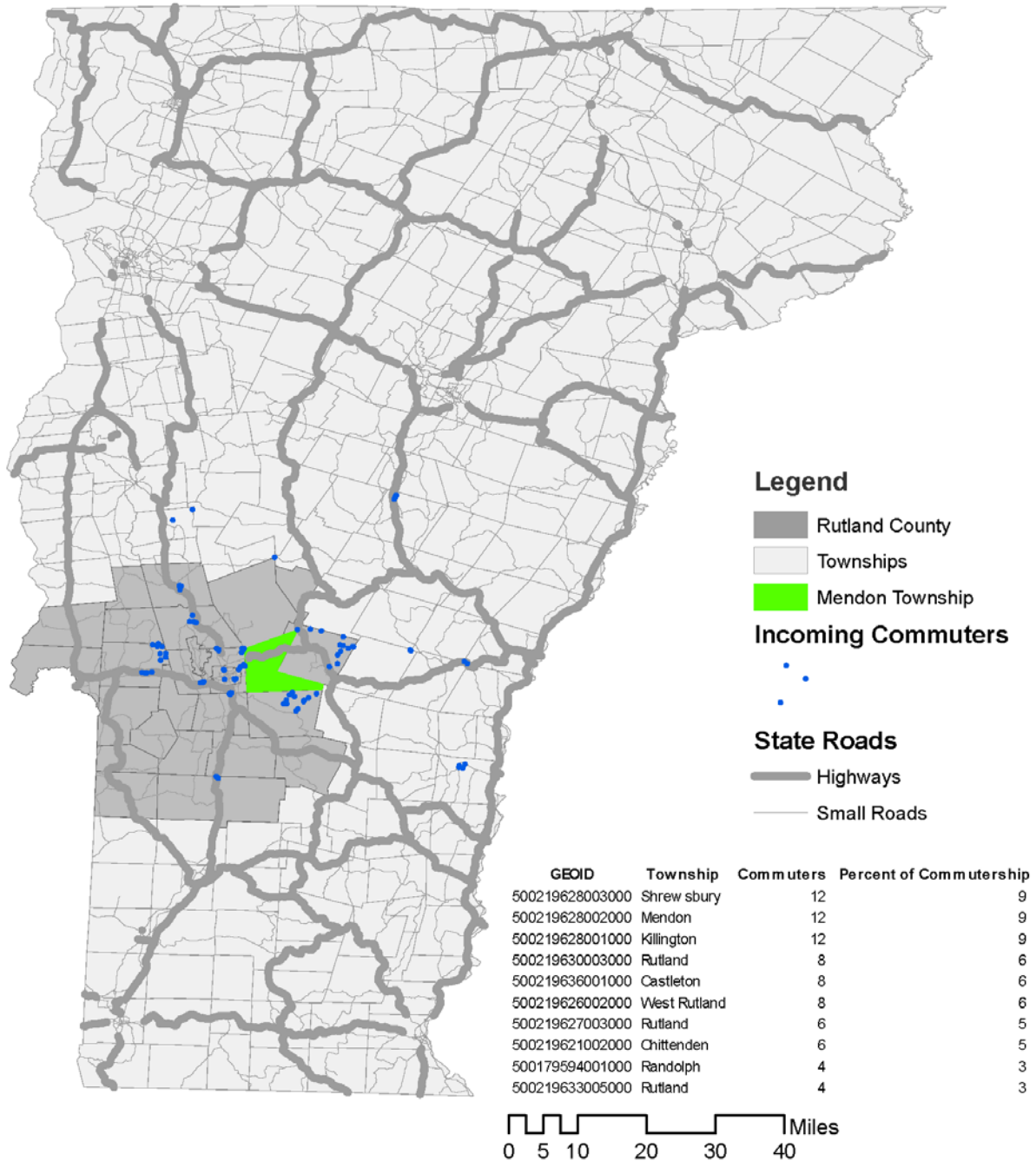
Commuters To Ira Township



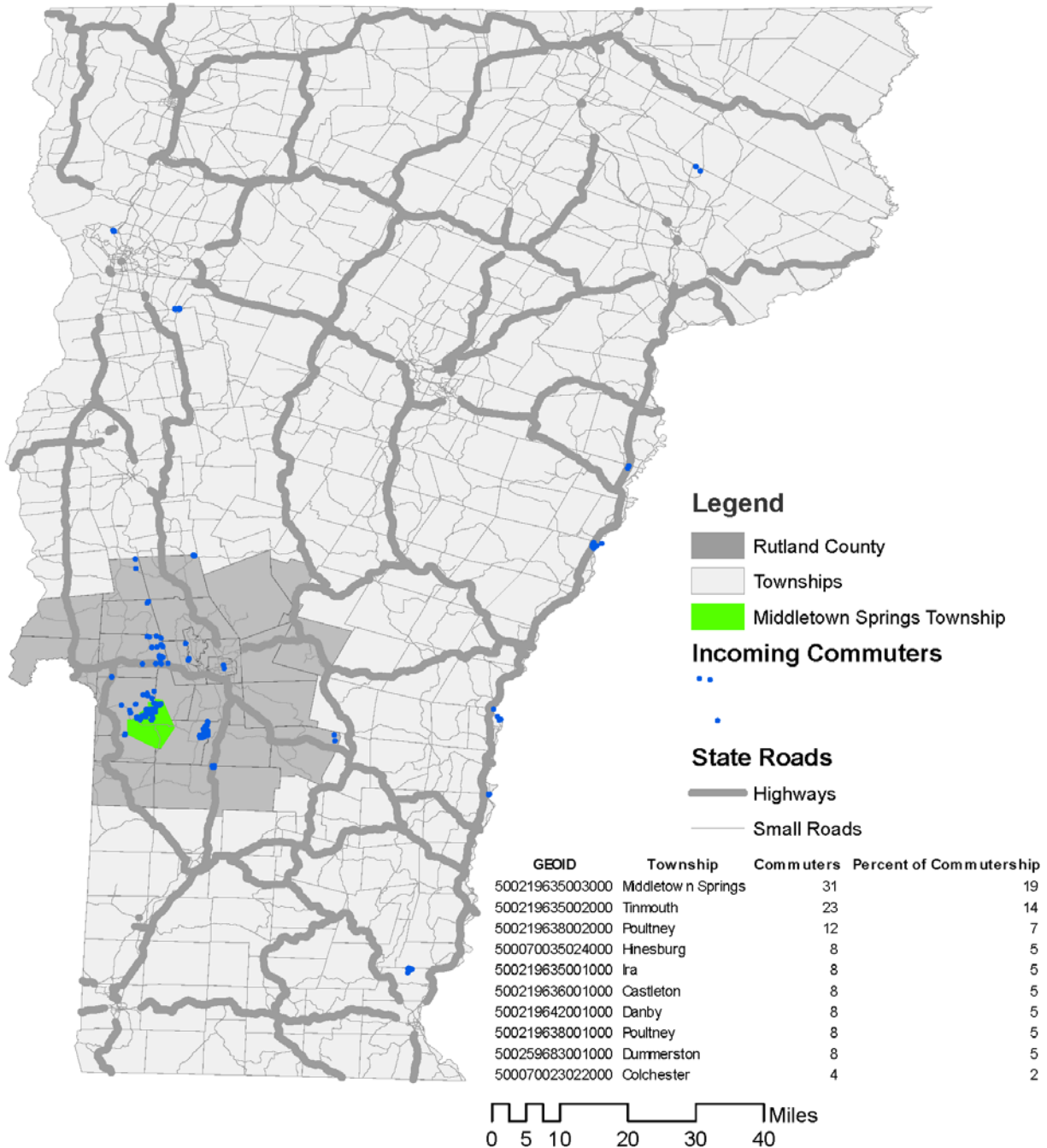
Commuters To Killington Township



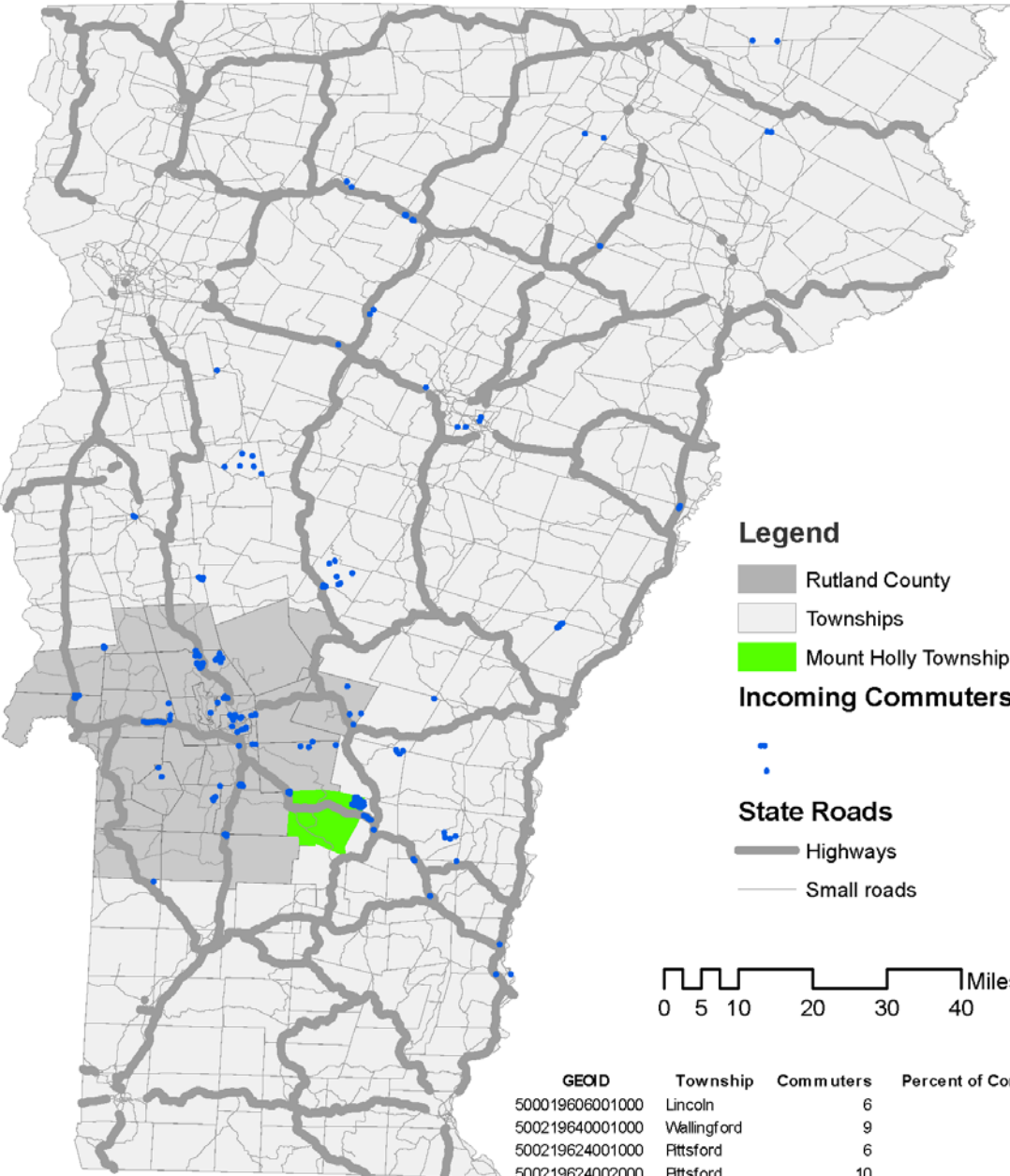
Commuters To Mendon Township



Commuters To Middletown Springs Township

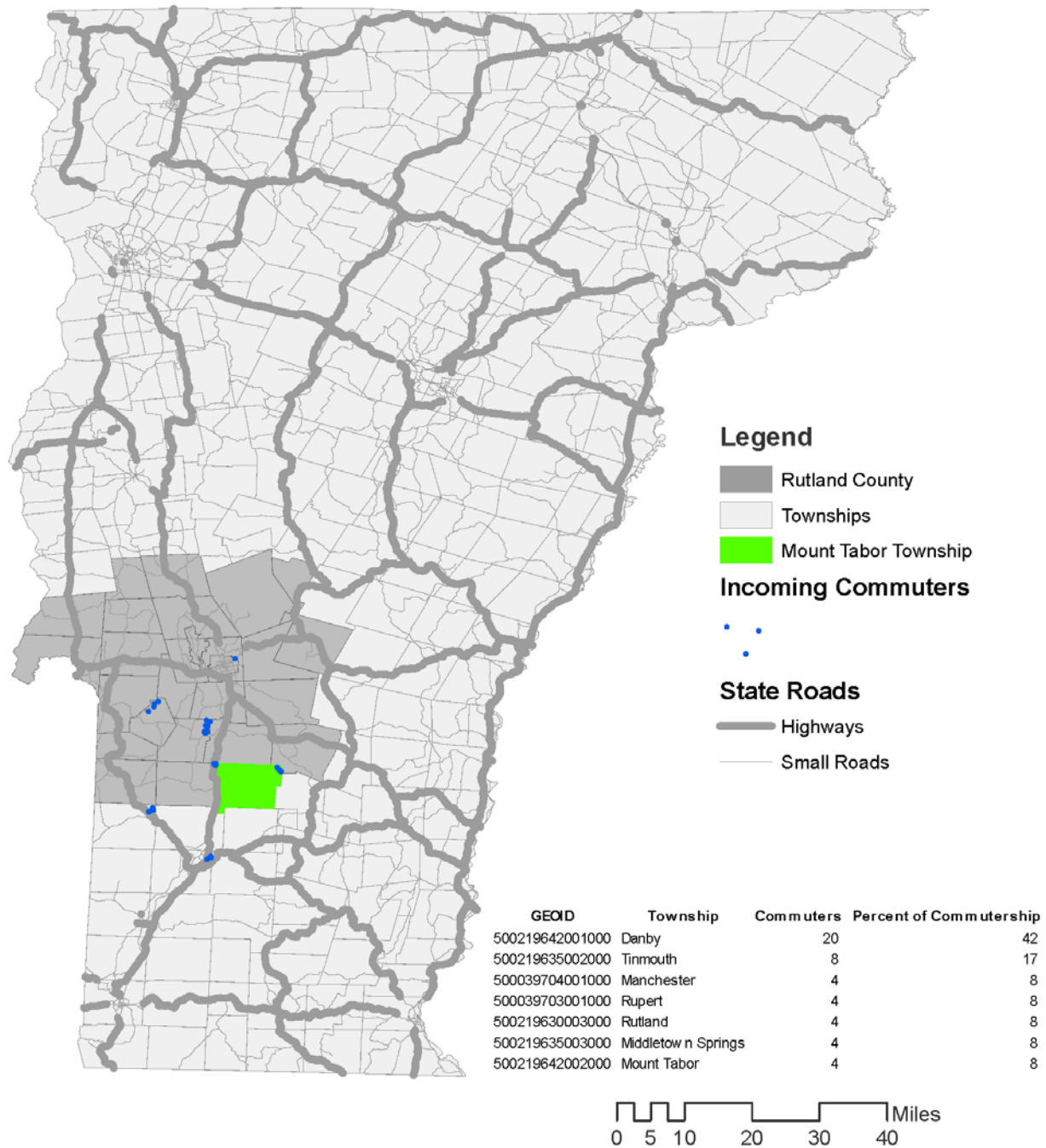


Commuters To Mount Holly Township

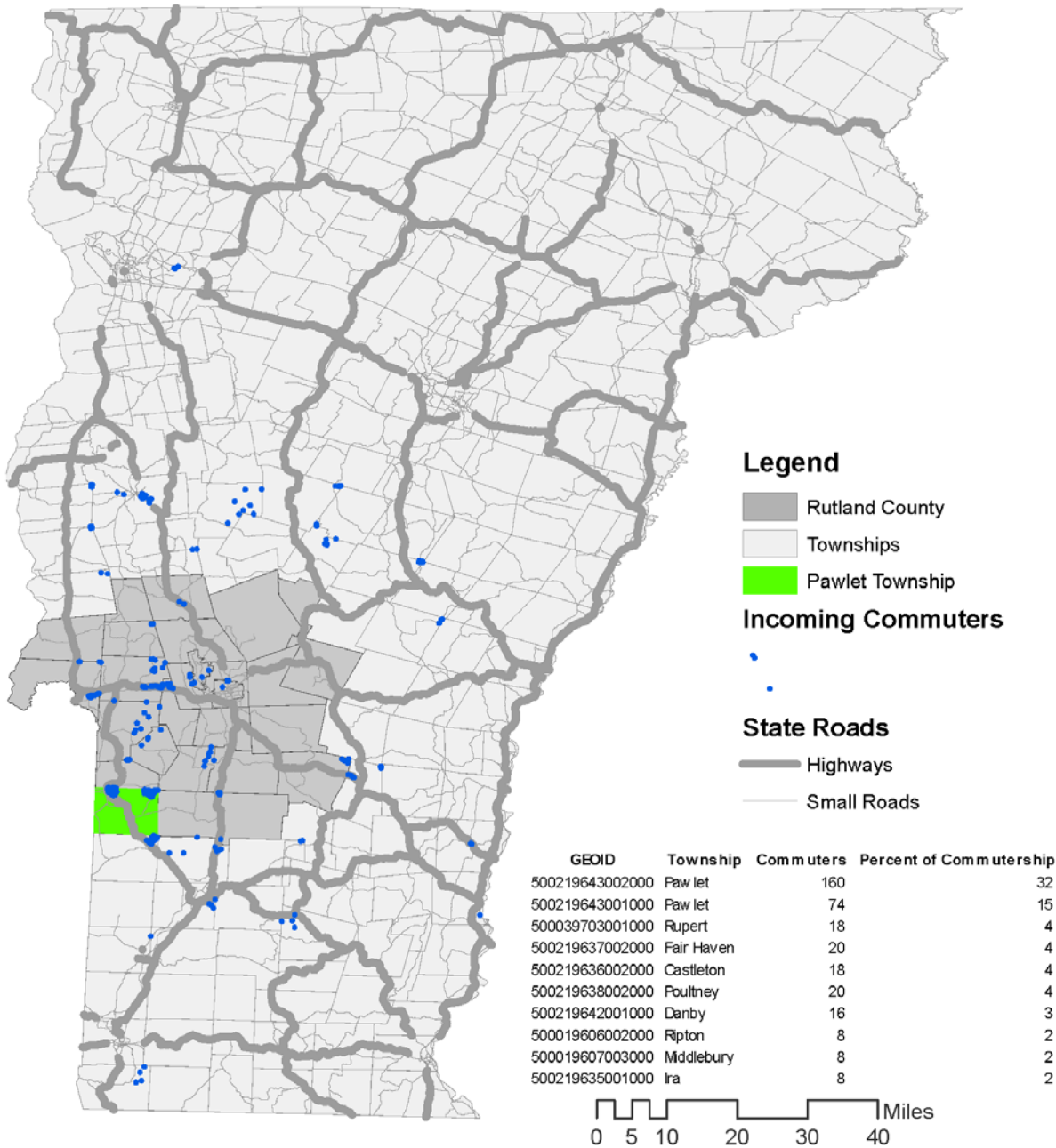


GEOID	Township	Commuters	Percent of Commuters
500019606001000	Lincoln	6	2
500219640001000	Wallingford	9	3
500219624001000	Pittsford	6	2
500219624002000	Pittsford	10	4
500259676002000	Westminster	6	2
500279663003000	Ludlow	8	3
500279653001000	Rochester	8	3
500279652002000	Rochester	6	2
500279654001000	Sharon	6	2
500279665001000	Chester	12	4

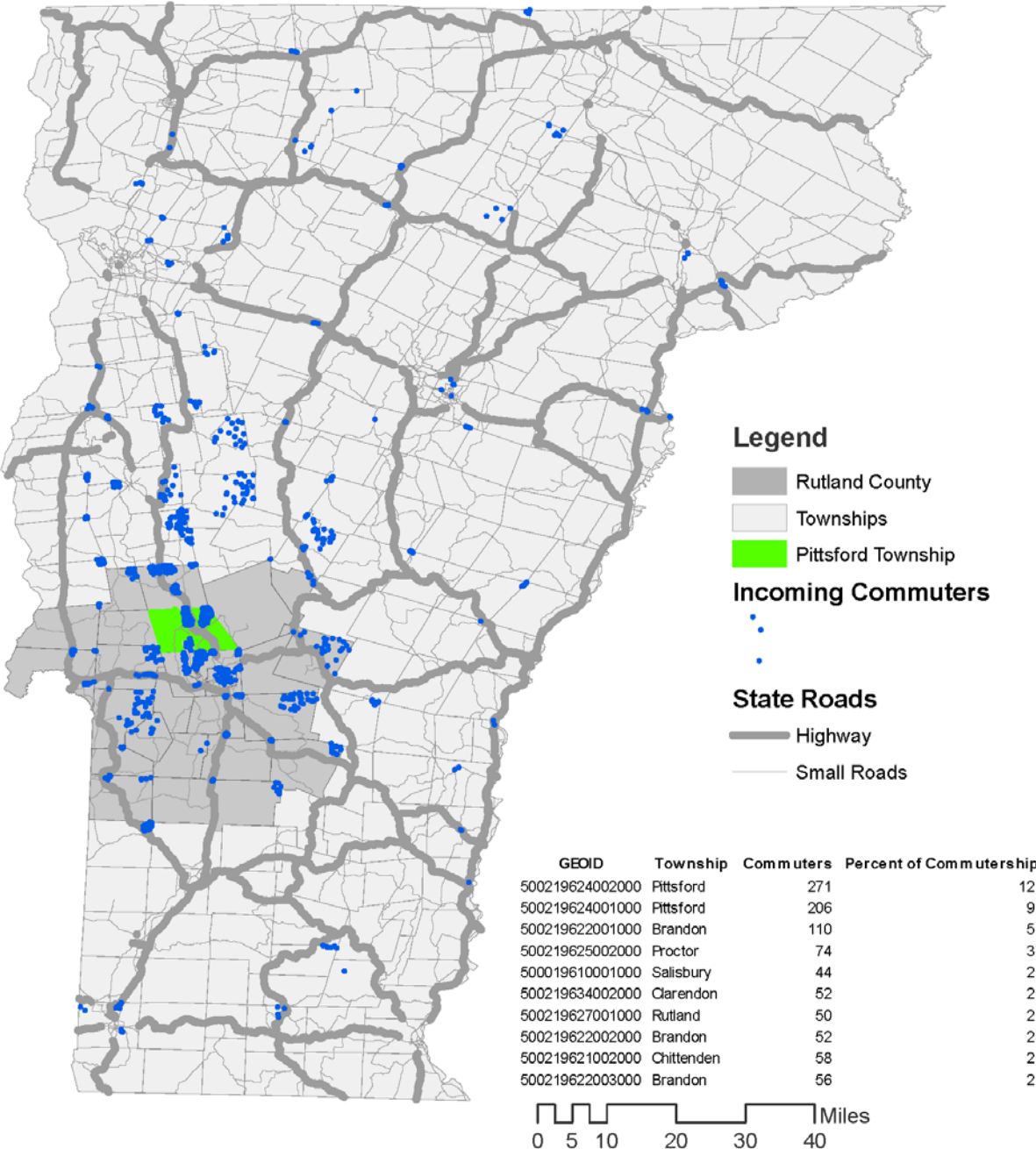
Commuters To Mount Tabor Township



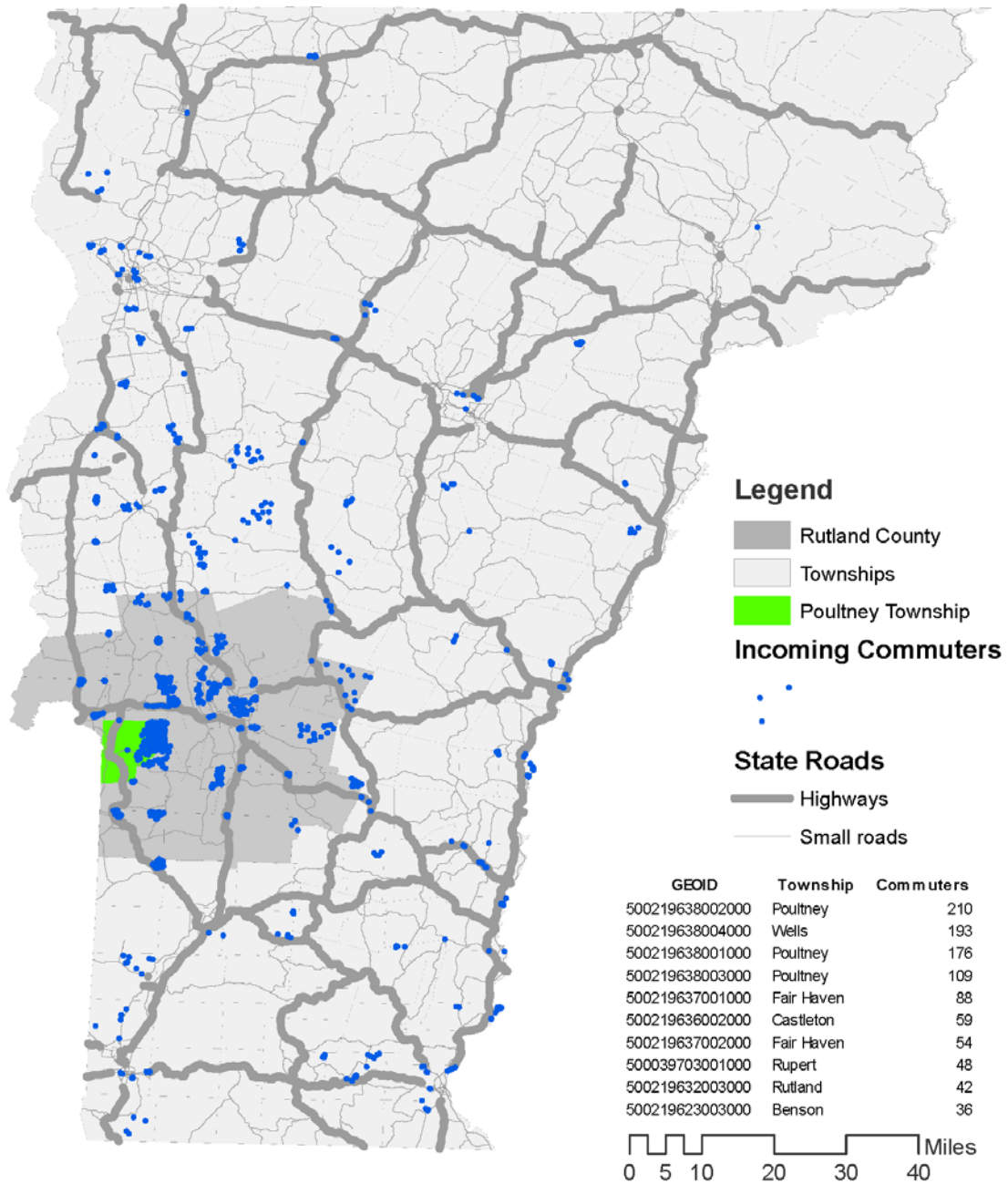
Commuters To Pawlet Township



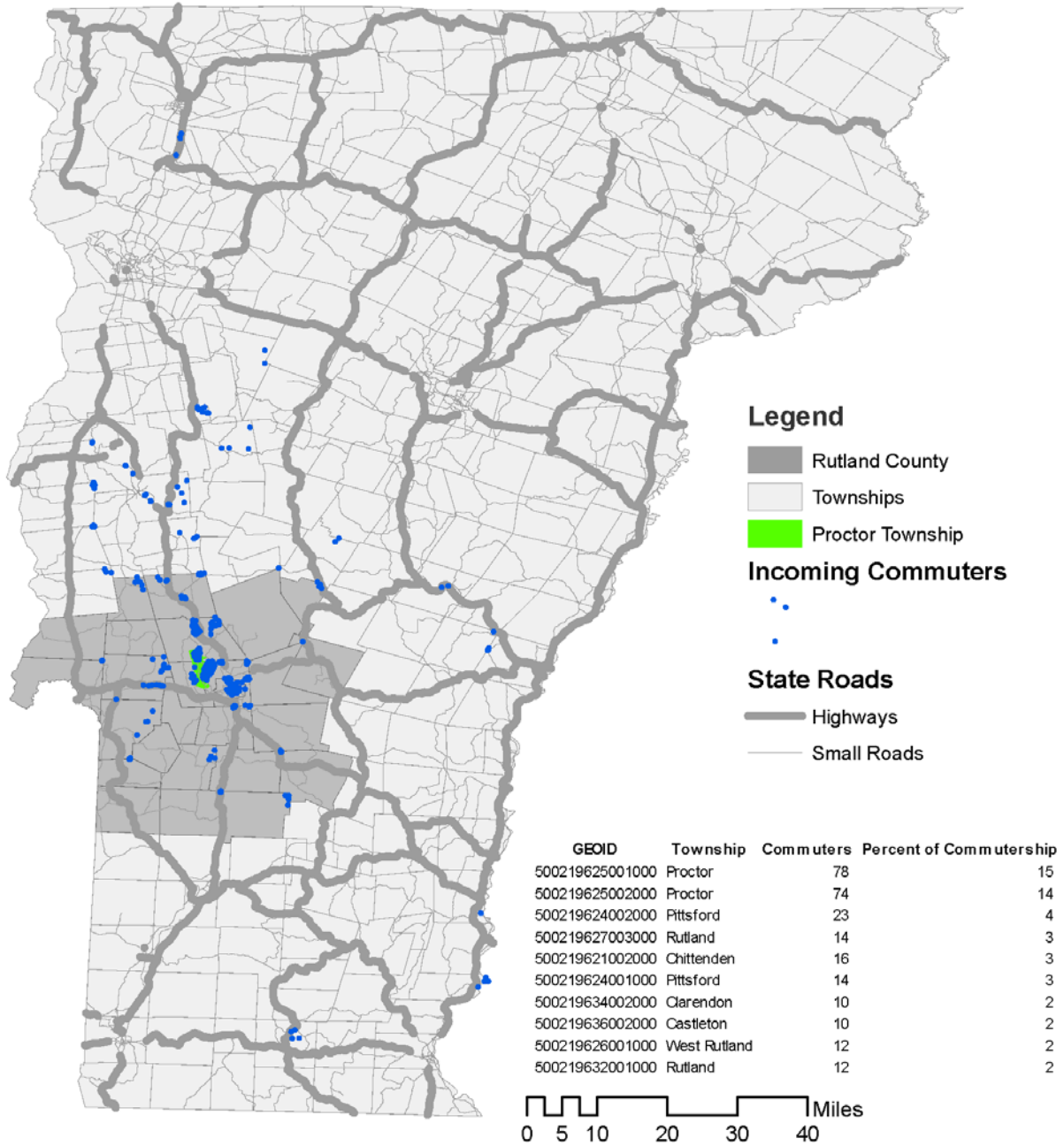
Commuters To Pittsford Township



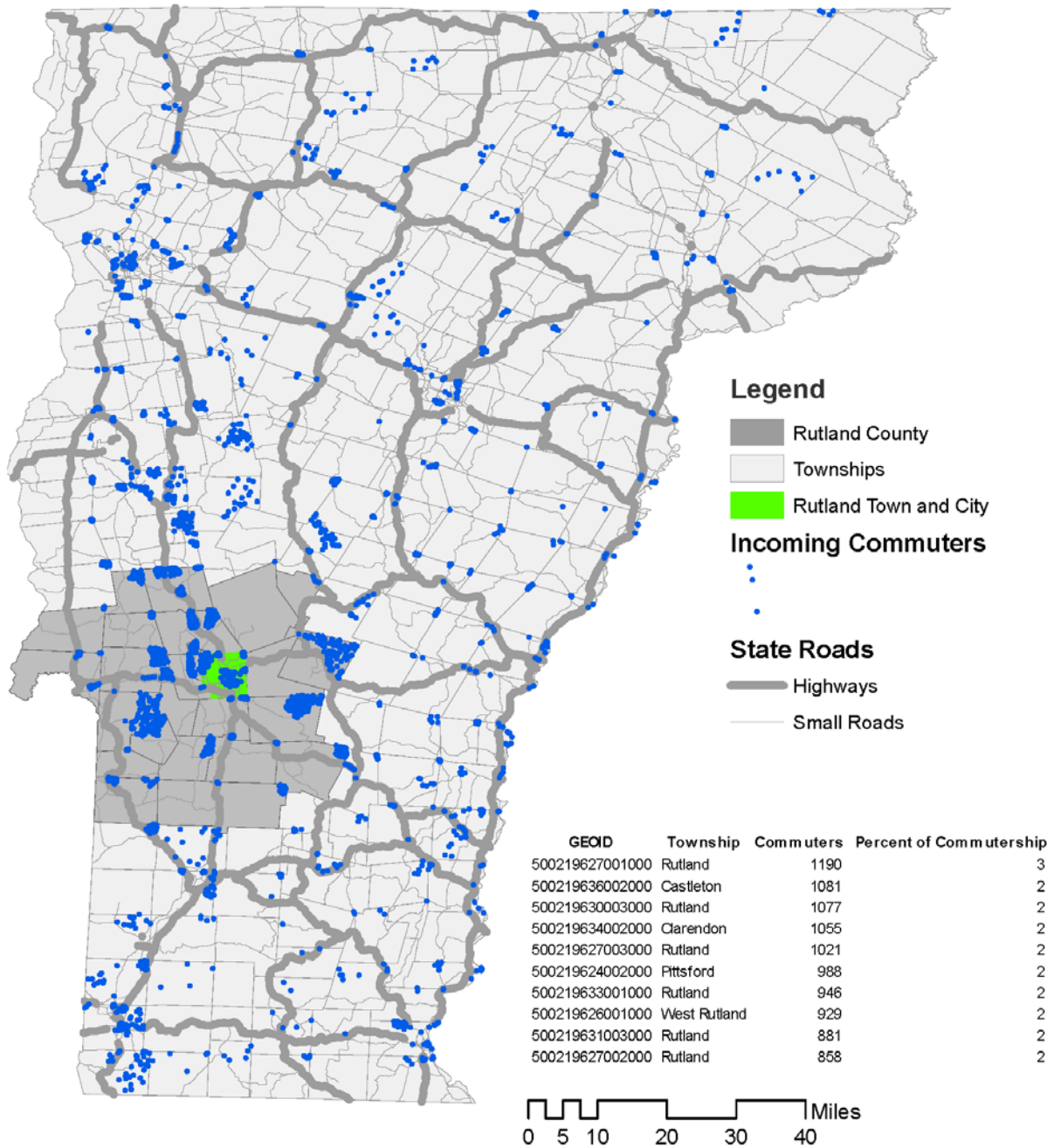
Commuters To Poultney Township



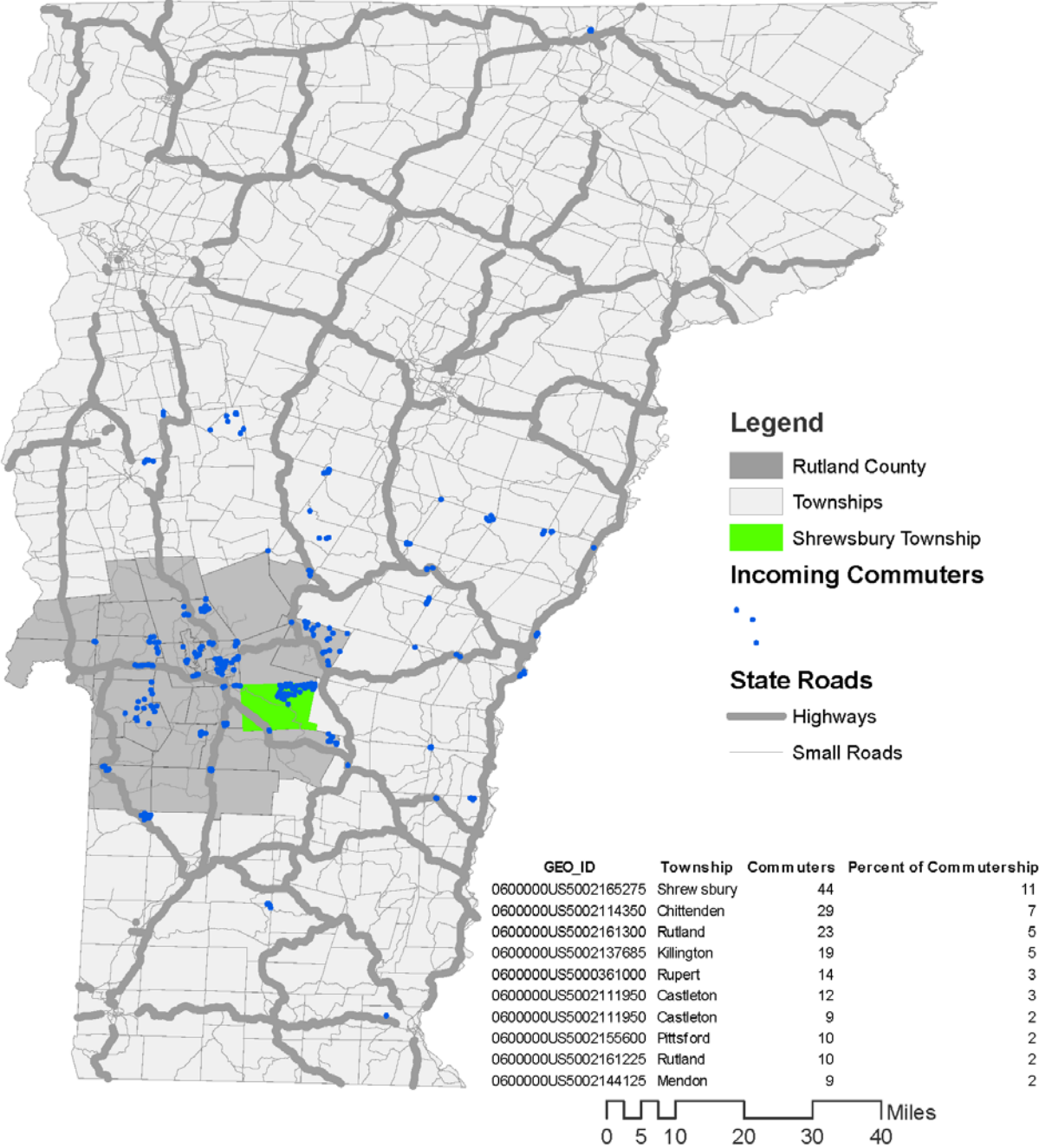
Commuters To Proctor Township



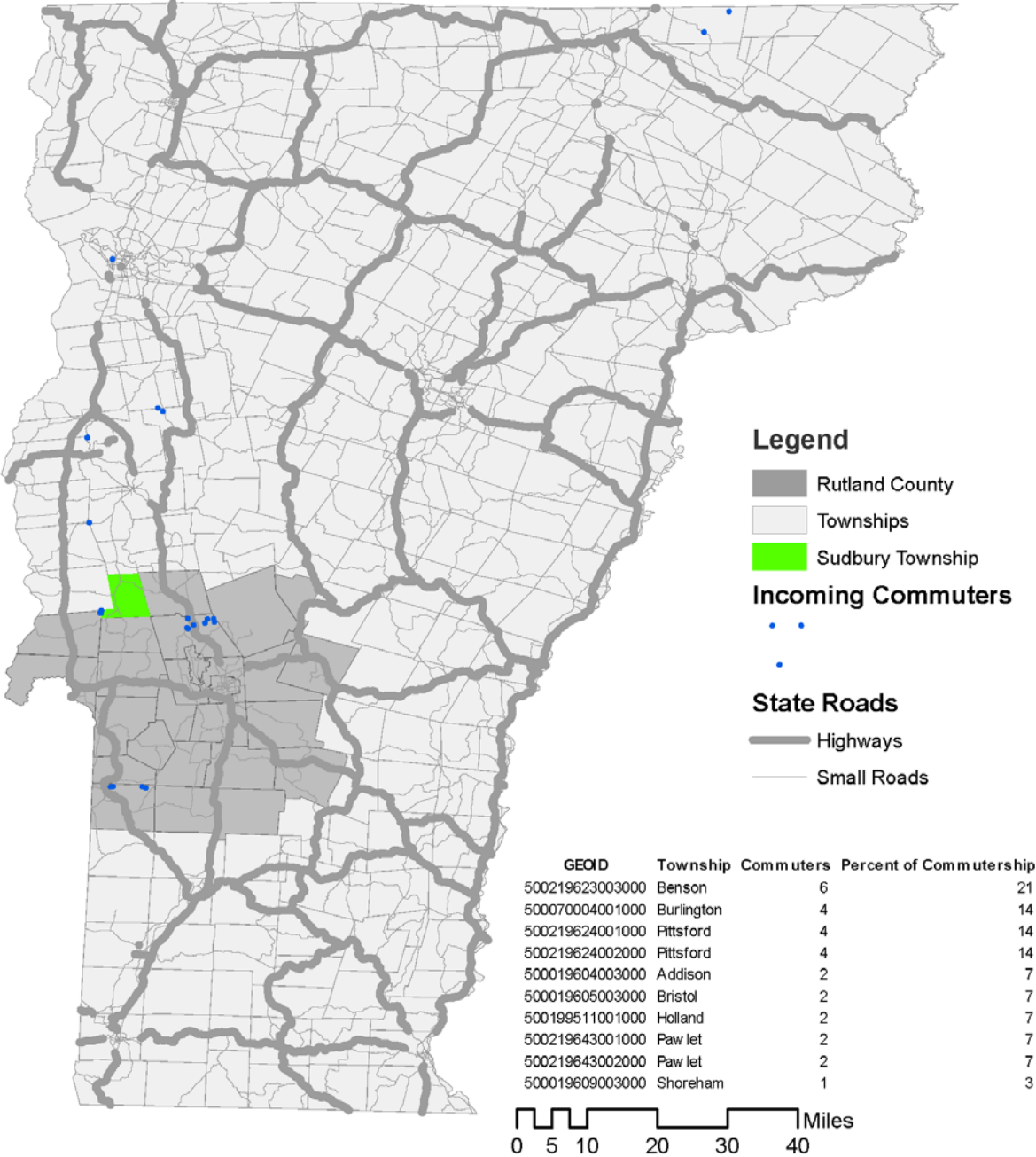
Commuters To Rutland Town and City



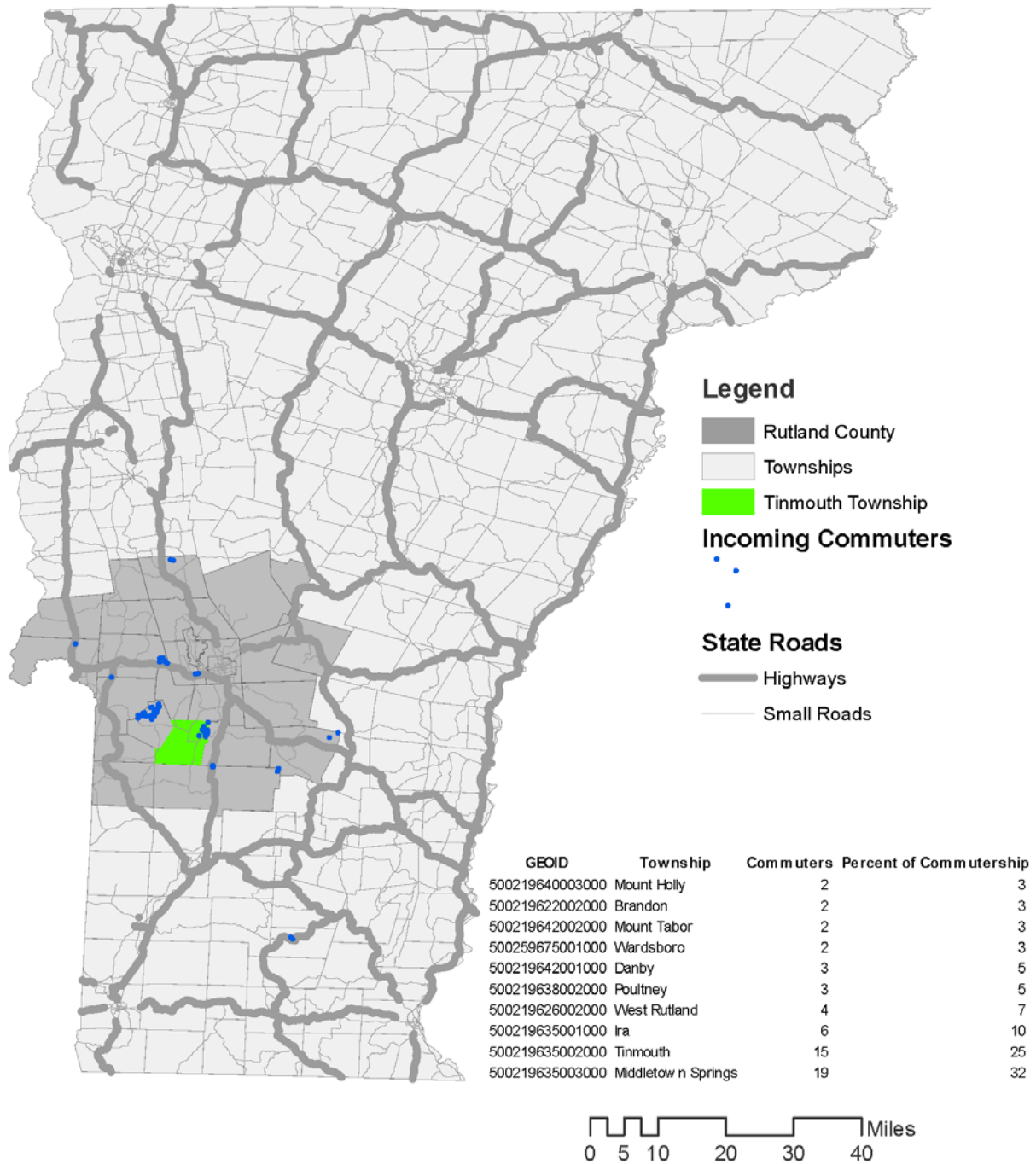
Commuters To Shrewsbury Township



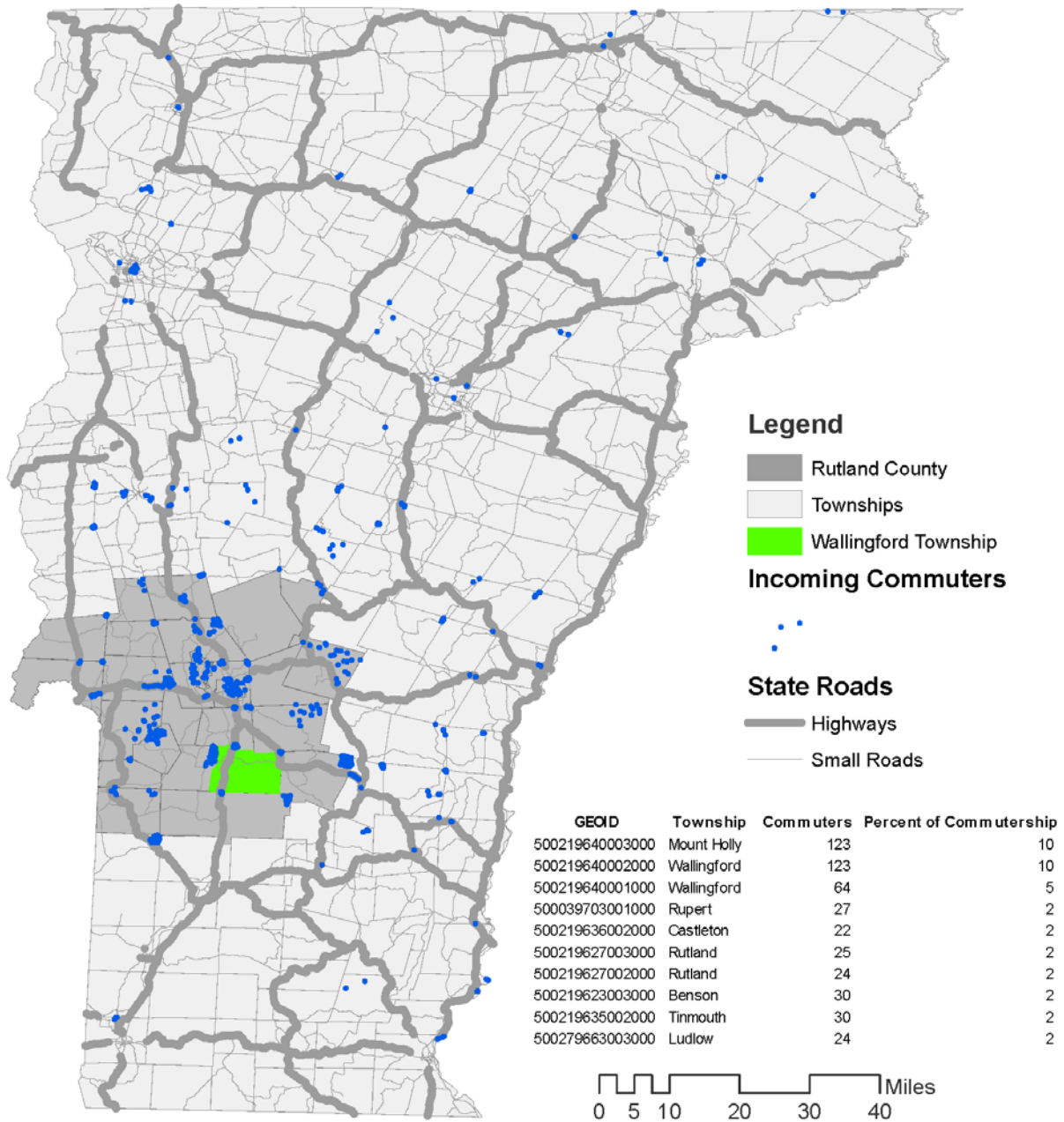
Commuters From Sudbury Township



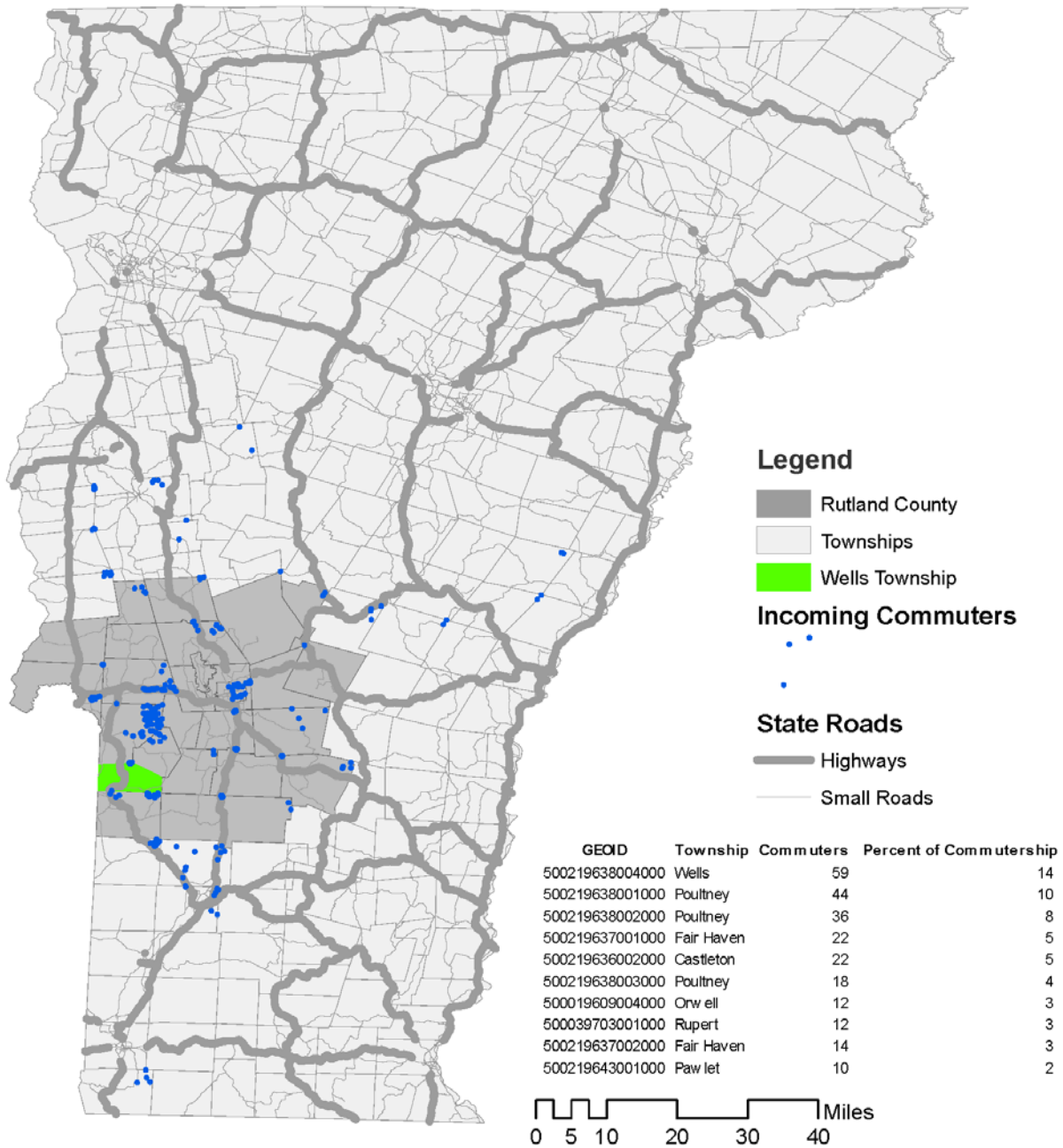
Commuters To Tinmouth Township



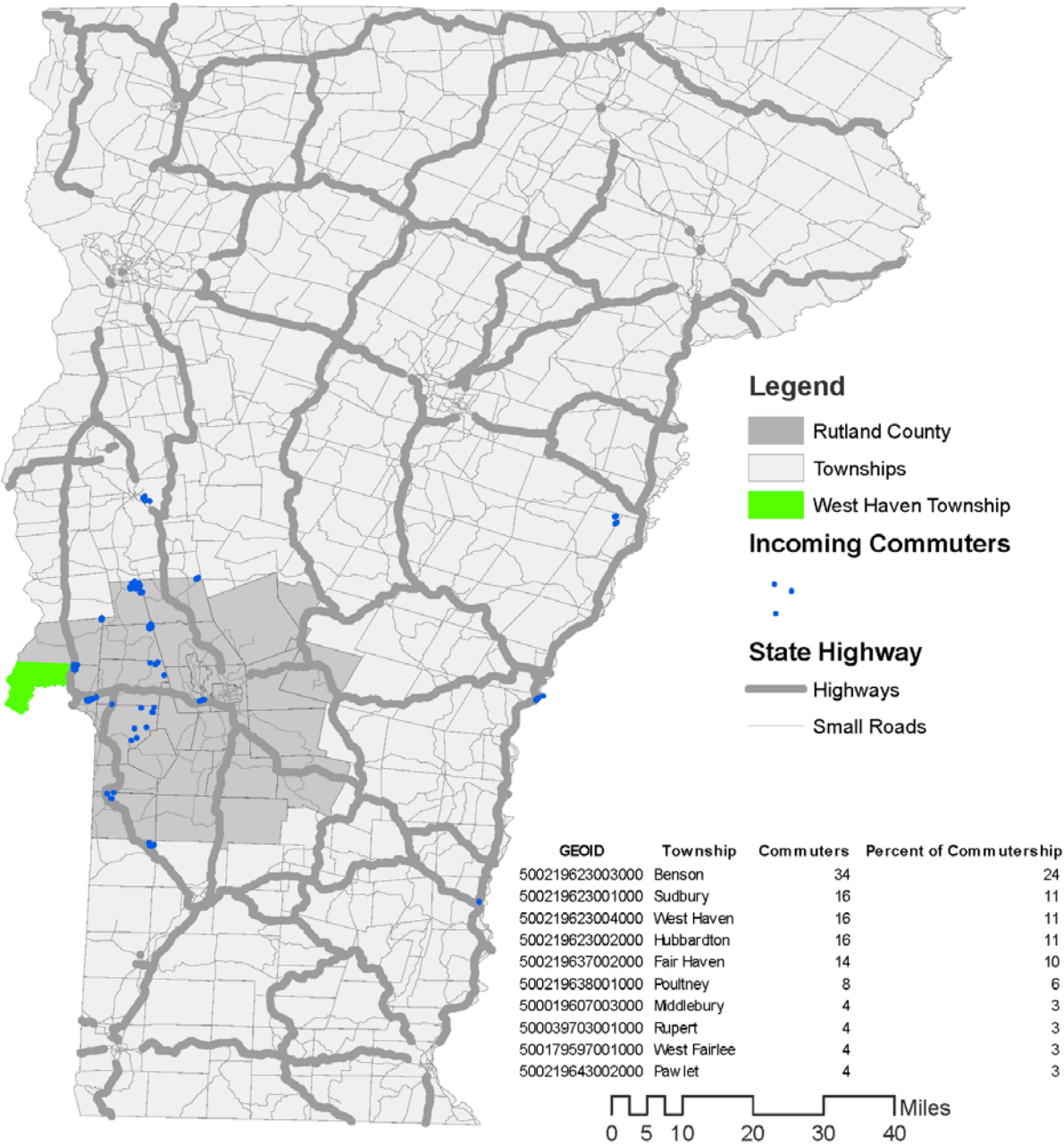
Commuters To Wallingford Township



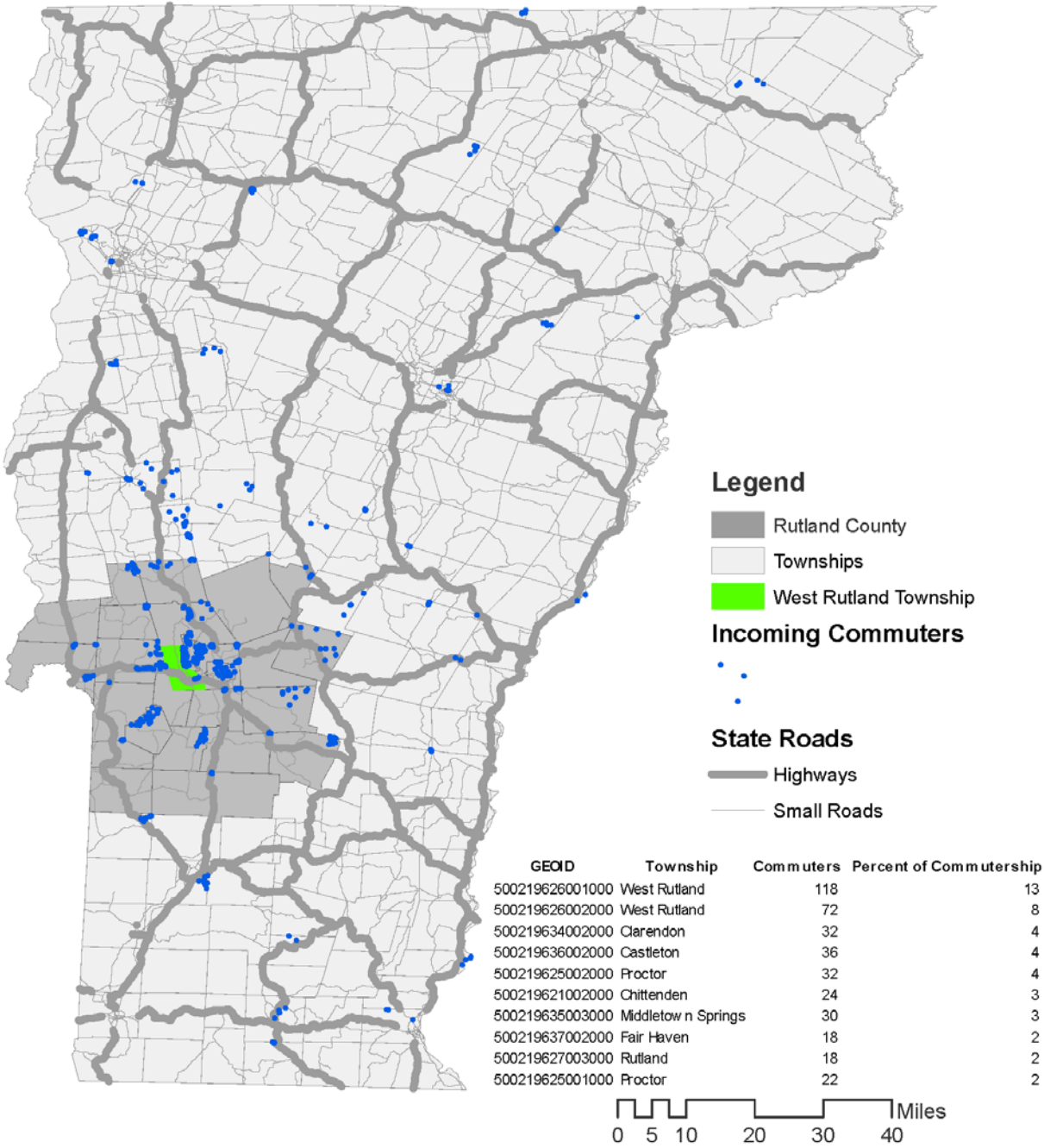
Commuters To Wells Township

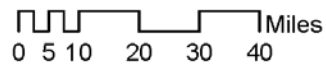
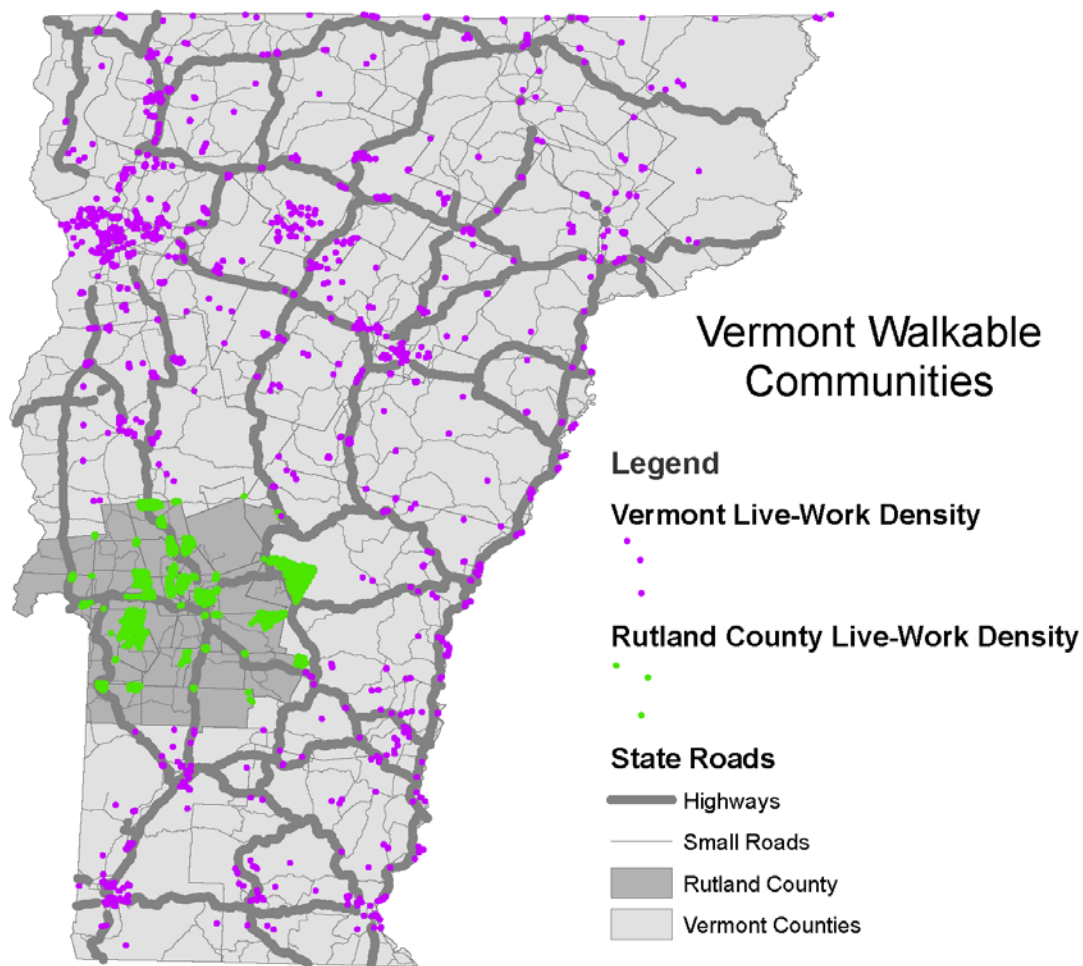


Commuters To West Haven Township



Commuters To West Rutland Township





GEOID	Walkable Township	Within Township Commutes
500219631003000	Rutland	2811
500219633001000	Rutland	2040
500219633003000	Rutland	1641
500219627003000	Rutland	1222
500219632003000	Rutland	1149
500219630001000	Rutland	1036
500219633002000	Rutland	778
500219627002000	Rutland	770
500219630003000	Rutland	651
500219633006000	Rutland	544

GEOID	County	Walkable Township	Within Township Commutes
500070010001000	007	Burlington	5743
500039710002000	003	Bennington	1728
500070010002000	007	Burlington	1699
500259686002000	025	Brattleboro	1596
500070040021000	007	South Burlington	1580
500070031001000	007	Williston	1386
500239546002000	023	Montpelier	1365
500039711002000	003	Bennington	1356
500239552001000	023	Barre	1333
500070027012000	007	Essex	1309

Distance-Weighted Commutership From Rutland City

